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UNITED STATES NAVAL INSTITUTE PROCEEDINGS

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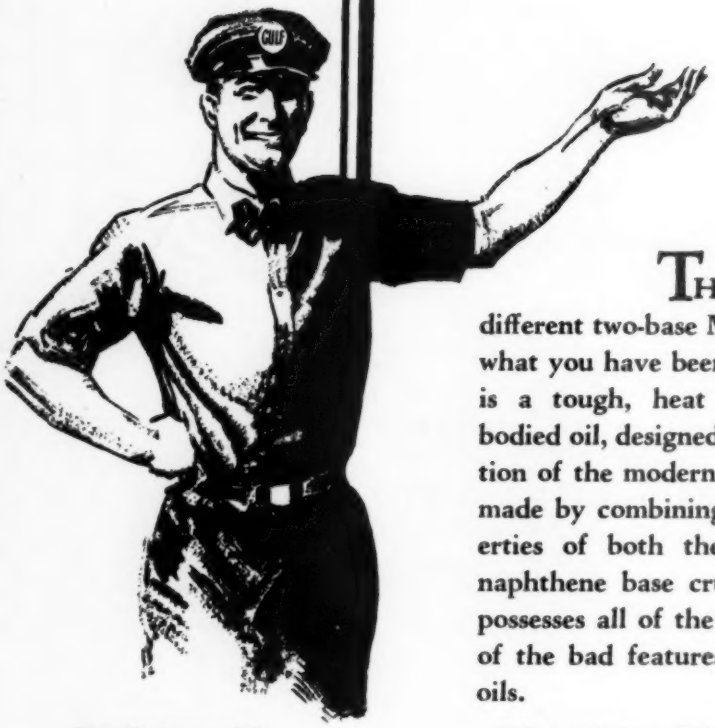

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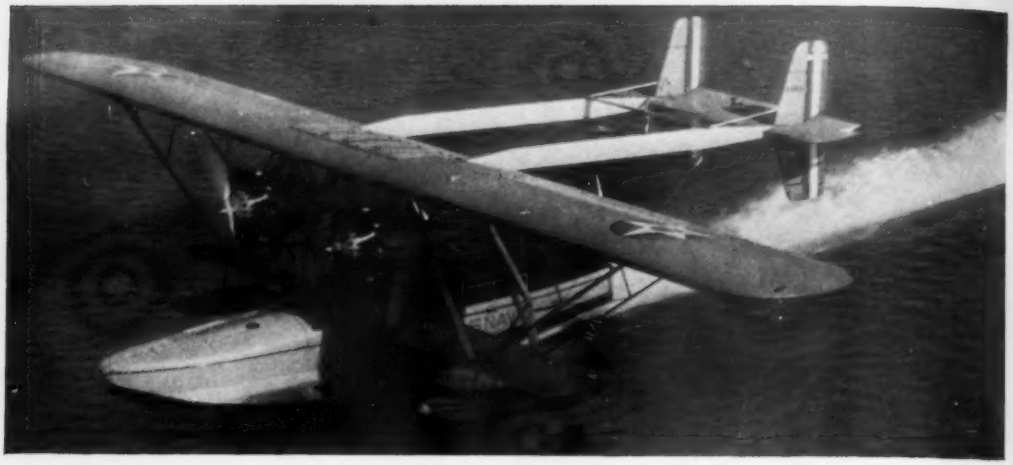

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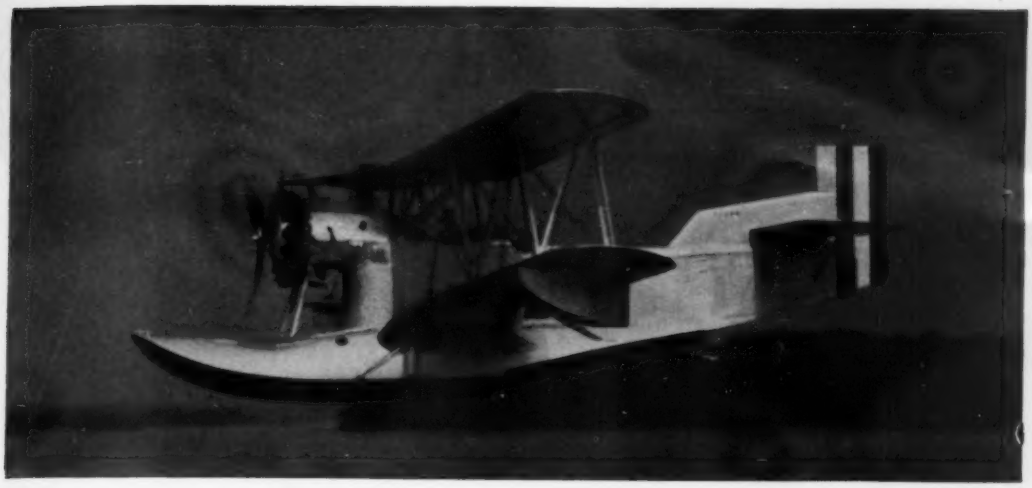

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AMERICAN FOUR-MASTED BARK *ARTHUR SEWALL*

This vessel was lost with all hands on a voyage from Philadelphia to Seattle in 1907. A feature distinctive of the *Arthur Sewall* was that the upper topsail yards did not lower away.

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THE FLEET FLAG TAKES A DIP
U.S.S. *Texas* in a rough sea.

THE FLEET FLAG TAKES A DIP
U.S.S. *Texas* in a rough sea.

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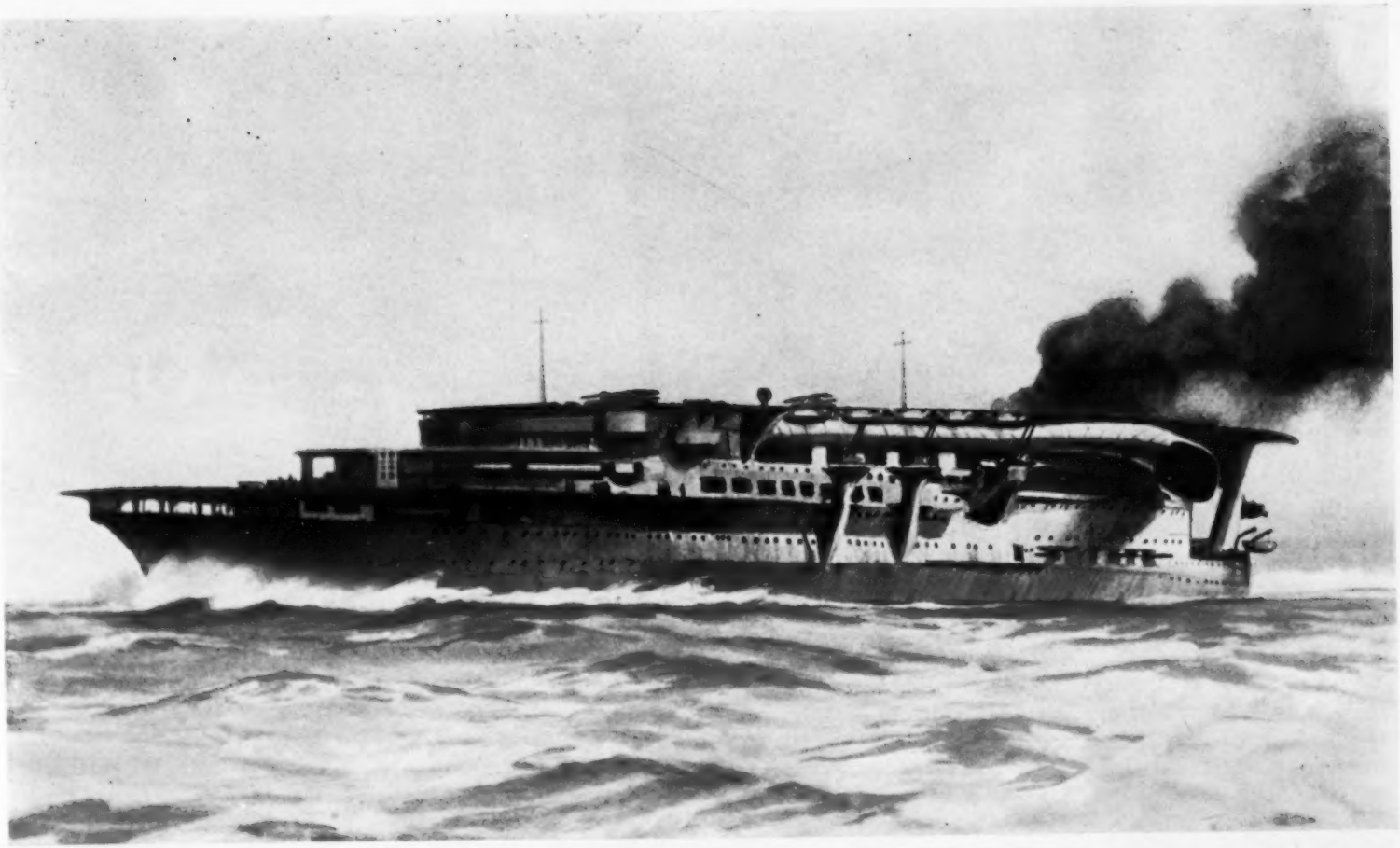
A LIFE ON THE OCEAN WAVE
U.S.S. *Texas* coming up after a dive.



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NEW JAPANESE AIRCRAFT CARRIER

The new Japanese aircraft carrier *Kaga,* as she will appear when placed in service. She was originally designed as a 40,000-ton battleship, but when the *Amagi* was destroyed in the earthquake of 1923, it was decided to transform her into an aircraft carrier. The ship can steam at twenty-five knots and accommodate sixty planes. A striking feature is the smokestacks.

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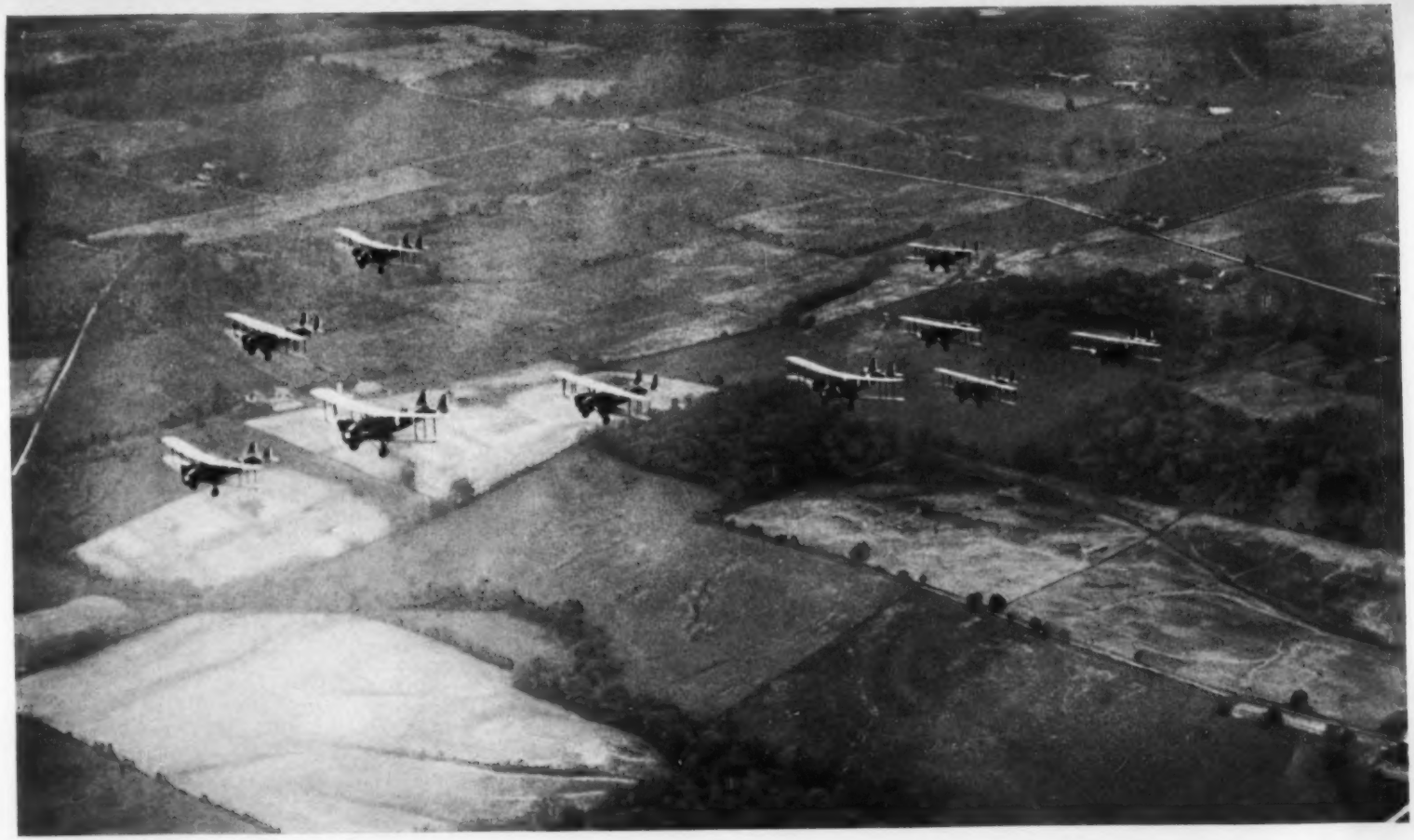

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THE ARMY IN AIR MANEUVERS

Bombers flying over Wright Field, Dayton, Ohio, in maneuvers in which 170 bombers and pursuit planes took part.

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VF3 SQUADRON, NAVY PLANES, IN LINE FORMATION FLIGHT

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PLANES OF AIRCRAFT SQUADRON BATTLE FLEET FLYING OVER LINDBERGH FIELD, SAN DIEGO, CALIFORNIA, DURING DEDICATION CEREMONIES

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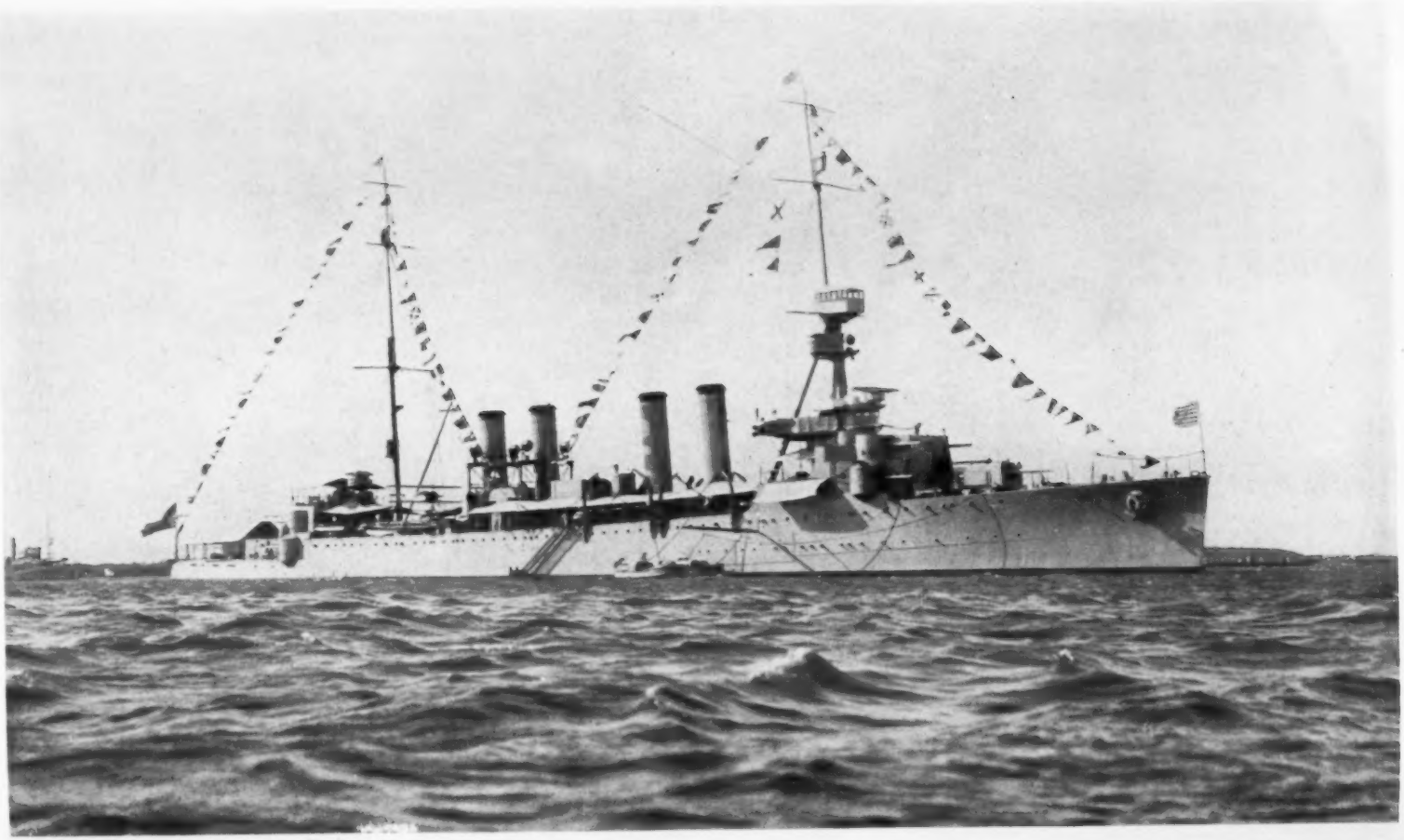

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U.S.S. *MILWAUKEE* IN GALA DRESS

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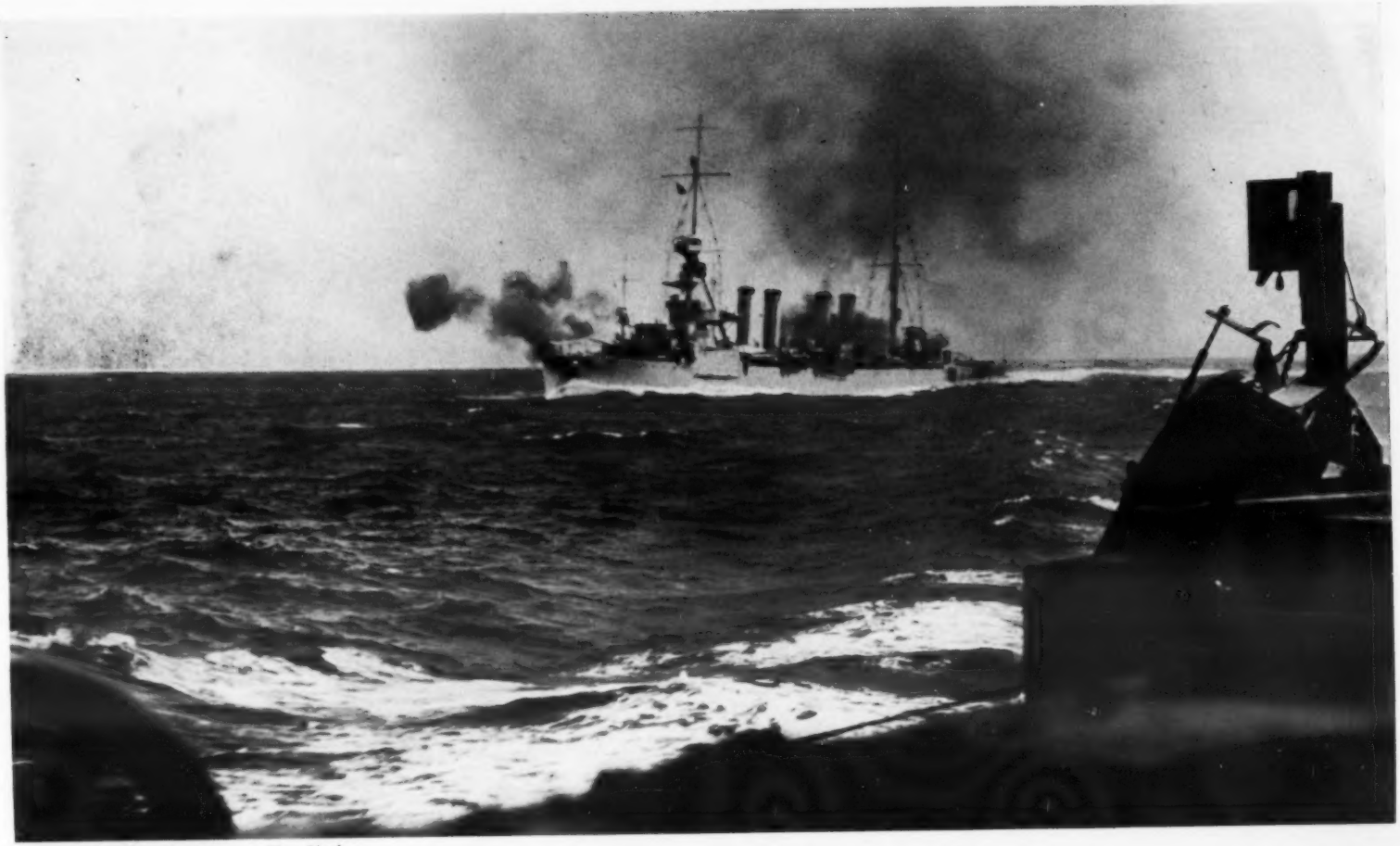

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U.S.S. *MEMPHIS* FIRING LONG-RANGE BATTLE PRACTICE IN SUBIG BAY

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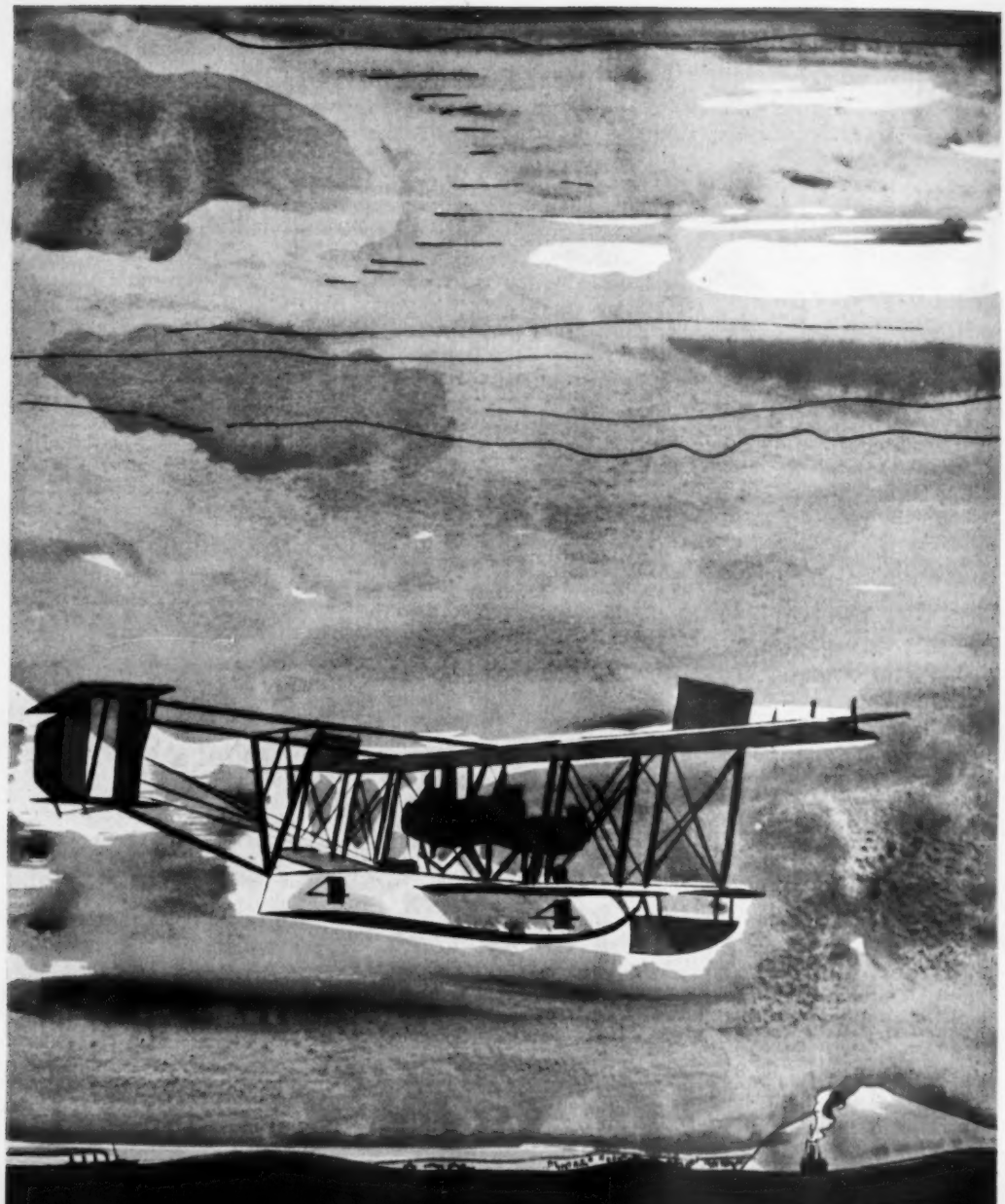

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Lieut-Commander Albert C. Read nears the Azores in a Navy plane, 1919

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Disarmament *and the* National Defense

By ADMIRAL W. V. PRATT, *U. S. Navy*

INTRODUCTION

IT IS not the purpose of this paper to discuss in great detail the various attempts towards a reduction of armaments. The question of disarmament is one which has a far deeper significance than shows on the surface. Most of the efforts have resulted in merely a local cure. The reasons why armaments exist and the purposes for which they are used are based on factors not too apparent. Therefore, if one desires to have an intelligent opinion upon the subject when these matters are discussed, it is necessary that the viewpoint be broad. So far as the limits will permit, this is the purpose of this discussion.

The bridging of the gap between nations, the closing of the chasm between classes, and the approach to uniform types of government, have brought the problem of foreign war and war between classes composing the nation, to the forefront as probably never before. The common universal contacts of today were regarded, two or three centuries ago, as unusual. The great scientific and industrial advances of the present age bring Europe, the Orient, and all parts of the world, as it were, to our very doorsteps. They are our neighbors today, who yesterday lived as strangers; and it behooves neighbors to keep the peace with each other. There is, therefore, a growing need for a more complete understanding of the subject of armaments, for after all it is with armaments that we make war, whether strife be external or internal.

At the very start, however, in our attempt to discover what is the right path to pursue, we are confronted with a situation which may be expressed in these words, "confusion in ideas and in terms." The people composing a nation, even though they be a unit racially, do not all mean the same things when they use certain expressions. Therefore, how can it be possible for the peoples of different nationality to apply always identical meanings to the same terms? Take, for example, such common expressions as "disarmament," "national defense," "aggression," "outlawry of war"; do they mean the same thing to all Americans? Indeed they do not. Then, why should we expect others to feel as we feel, or see with our eyes? There are, however, certain broad principles involved and a breadth of view which may be common to all wherein may lie the path to mutual understanding.

To begin with, it might be well to name the basic factors involved in the breeding of wars. These may be reduced to three simple ones: ignorance, selfishness, and fear. If we would take the trouble to think upon the subject, and exclude from this category the religious wars, it seems a fair statement to make that the struggles of the past, certainly those waged since the Reformation, may be attributed to the three factors stated above.

On the other hand the most perfect instruments, including the personnel involved, for carrying on war are: huge armaments,

state of mind, financial strength, national resources, racial unity, geographic position, respect for law and order, strength of national character, strength of individual character, knowledge, religious conviction, class consciousness, unity of purpose. These may not be all of the instruments which might be mentioned but they are certainly some of the most important.

Again, in approaching the subject of armaments we find that people, broadly speaking, may be divided into three classes: the conservatives, the radicals, and the moderates. In general these three heads will represent the point of view with which the nationals of a country will approach the subject, if they can visualize it at all. For the purposes of this paper the conservative is a man who has the point of view of the bureaucrat or is one so steeped in the traditions and practices of bygone days, that he can see no way ahead of him which does not involve carrying on into the future, without modification, the thought and methods of the past. The radical, on the other hand, is a man, possibly highly intellectual, who allows his imagination to roam far afield, who sees a condition existing at present which is highly unsatisfactory and who believes that it is necessary only to think that a thing should be and the state of affairs which he imagines will come to pass. These people are apt to be free and sometimes deep thinkers but, as a rule, they never have been saddled with the responsibility of carrying into effect the dream which they believe should come true. Between the two lies the moderate. Such a man may realize the unsatisfactory condition of things but he, however willing he may be to ameliorate present conditions, never wishes to step faster than is safe. As a rule moderate thinkers are the executives and leaders in their chosen professions.

To comprehend the subject under consideration, all of the above-mentioned items must be considered and in addition the approach to the subject should be made analytically and in an orderly way. First, a definite understanding of the terms used and ideals held must be attempted; second, an examination and an analysis of the subject should be made; third, an explanation of the methods used for limiting armaments ought to be given; fourth, the effects on the national defense stated; fifth, any additional ideas or suggestions in connection with the subject of armaments, making for national or universal betterment, set forth.

The above outline, in general, represents the present method of approach to the subject. To attempt to deal with the matter in any other manner, or to limit it to a discussion of the methods used for a reduction of armaments, would leave the question in a nebulous state out of which no lasting good could come.

CONFUSION IN IDEAS AND IN TERMS

To begin with, consider the subject of religion. The followers of Christ cannot be expected to feel, on the subject of war, as does the Hindu, the Mohammedan, or the Buddhist. The Brahmin is a firm believer in class and caste. The Buddhist, speaking broadly, puts his faith in law, so much so in fact, that the nations who profess this creed have become in the past almost static, insofar as actual modern world progress is concerned. Of course the fact that a man is a Hindu or a Buddhist does not by any means comprehend all the reasons why certain nations have not advanced materially, but the profession of these creeds does tend to produce a state of mind radically at variance with those groups which practice Christianity. Broadly speaking, they move more slowly. The followers of the Prophet dream of a paradise attained through the agency of the Flaming Sword. Their attitude toward war differs materially from the point of view now held by the nations professing Christianity.

Take the matter of ethical, social, and economic conceptions. No two nations, unless they be akin racially, have the same conditions confronting them, and are intellectually, morally, and materially in the same state of advancement, can be expected to think alike. Peoples now unfavorably placed from a worldly point of view, who see other men happily conditioned, this position having been won in the past through methods of aggression, must wonder whether the aggressive method is not the right one to adopt, if they wish to gain for themselves a material place in the modern world.

Conception of government plays its part. The monarchist, the extreme radical, and the submerged man do not feel towards

government as does the man whose forebears have lived for many years under more liberal and democratic institutions. Their reaction toward armaments and the use to which they may be put will vary essentially from those of the man brought up in a more kindly atmosphere.

Attitude toward local and federal laws is an important item. A person who loathes obedience to the laws of his country will, in turn, have an equally loose attitude toward his neighbors and toward the laws to which they subscribe. Disrespect for one's own institutions will breed disrespect for the institutions of others. This man will strike more quickly than will the average person. The professional gunman and the flagrant violator of federal laws are types of this class. They are impulsive and inflammable; they believe in no law except that which suits their own convenience.

Standard of living is one of the most important factors of all. It is impossible to expect the people of a nation living on a scale far inferior to that of one more favored, not to realize their disadvantages; not to wish to secure these benefits for themselves. To say the least, they will envy those more favorably placed and, unless actuated by a high order of altruism, will attempt to obtain similar standards for themselves, by force if necessary.

National expansion, sometimes taking the form of imperialism, is a potent source of trouble. The people in a country expanding successfully are prone to feel, so long as success attains their efforts, that they are right. A state of contentment exists in their own realm, but such may not be the case with others. What may be considered right by one is not necessarily so considered by the other.

Racial difficulties is a problem in itself. It may be neither wise nor necessary to believe that the solution of this question is found in racial amalgamation. Very few people, certainly of the most advanced races, can see this as a reasonable solution. Purity of blood is something about which the dominating nations feel very strongly, and it cannot be said that this attitude is not right. Nevertheless, we must face the fact that so long as racial problems exist the chances for a complete limitation of armament or of disarmament are small.

Labor troubles have their place in this category of ideas and terms. So long as we in America hold to high standards of living, give to the laborer his proper place in the world of affairs, and he in his turn appreciates what is being done for him, little permanent trouble should be expected from this source. But can this be said of other countries not holding to the same high standards of arbitration and conciliation between labor and capital? Out of labor troubles may come civil war, and if it arises can we be too sure that there may not be a sympathetic repercussion here? Even if we do exist on favorable terms with life, can we be confident that we may not be called upon to guard zealously the standards we set for ourselves?

Since the great radical revolution in Russia a new order of thought has come into existence. The views of the party in power towards government, economic, and social conditions are entirely at variance with our own. Should an attempt be made to force these opinions upon us, could we, having in mind our own ideals, supinely sit still? It is true that time probably will work many changes in Russia and that a code of life more compatible with our own will prevail. But in the meantime a condition does exist which prevents us from accepting, too complacently, a state of affairs in which we have no faith.

International law, even amongst the most law-abiding nations, has not yet become so stabilized that different interpretations of it cannot be made. While certain fundamentals do exist, which most countries agree to, yet in the interpretations of international law, methods will vary. Any state believing in or wishing to make of war an unlimited operation will have a different point of view, in its interpretation of fundamentals, from the country desiring to see war limited. In the last war there was a marked difference in the attitude toward war held by the Germans and by the British. Even amongst the Allies themselves there was a divergence of opinion as to correct interpretations of the law. Between the belligerent and neutral groups there was even a greater dearth of accord in their viewpoints. Today, though we are at peace, there is, nevertheless, a lack of harmony in the opinions held by some of the foremost nations in regard to that moot question, "freedom of the seas."

Coming now to an item about which there is much discussion at present, namely, national defense versus aggression. What does national defense mean? What is aggression? We in America, separated by thousands of miles of water from potential enemies, safe in our somewhat isolated position, cannot hold the same opinions about this question as does the Frenchman who for centuries has sat on the edge of a volcano. What he may feel is his proper right in the defense of the realm, we are apt to regard as bordering on aggression. We must put ourselves in his shoes to think as he does, and he, in turn, must cross many miles of water to hold our point of view. The factors, national defense and aggression, on the borderland where the two meet, melt into each other so imperceptibly, that it is difficult, in fact impossible, to lay down specific definitions except in a most general and simple way.

Two terms often confounded are "pacifism" and "peace loving." The American is preëminently a man of peace. He may not claim this preëminence from his racial inheritance, for he is derived from European stock, but for centuries he has been surrounded with a different environment and has inherited certain traditions in the matter of religion and the conduct of public, social, and business affairs which tend to develop a purely American character, peace loving and rather generous, liberal and sound in judgment though sometimes intolerant. Between the pacifist and peace lover there is a wide chasm. The peace-loving man does not desire war but he will fight for what he believes to be right. The true pacifist wants peace at any price.

Militarism and discipline are often confused even by the most liberal and fair-minded people. The true militarist is an autocrat, narrow in his judgments and bureaucratic in his administration of affairs. The term often has been applied ill-advisedly to our military and naval forces. The true militarist could not be a good American although he might find a place in other military organizations. Discipline and service are the keynotes of American military character. It is the inheritance handed down to the services from the first settlers of this country who were men willing to fight for their religious convictions or for the invasion of their rights. These men gave this country its religious tendencies, were sponsors for our Declaration of Independence, and were the framers of our Constitution. They led disciplined lives and every American, even though he be a military or naval man, takes pride in carrying on the old traditions untarnished.

We now come to the terms "disarmament" and "limitation of armament." To some people limitation means disarmament. Those men are the radical thinkers who, without realizing fully or being willing to admit the handicaps under which we live, would disarm by example. When we lived within our own borders and were occupied with the development of the resources of our growing country, armaments, relative to foreign nations, did not mean much. The times have changed. America has expanded beyond its own borders in its dealings with the world. We have interests abroad which it is right and proper for us to protect, interests, let us hope, which invade no other nation's lawful or moral rights, but interests which we should uphold. However much we may believe in disarmament in theory, in practice, to the moderate thinker, and to the man held responsible for his actions, disarmament now can mean only limitation of armaments.

The above are some of the ideas and terms which every man must consider when he views the problem of disarmament and national defense.

Examination And Analysis Of The Subject

No man can form an intelligent opinion and pass judgment on this subject who is not willing to face the fact that wars always have existed in the past, and that in all probability the late World War was not the last one in which mankind again may be engaged some day. The results of the last struggle were so disastrous that it is the present-day tendency to insist that no war ever again shall be undertaken and to endeavor to take all steps to prevent its recurrence. This is correct, but in our desire to achieve this estimable condition we may perhaps overlook the fact that at the end of the Thirty Years' War in Europe a state of affairs existed so distressing that a great hatred of all things military sprang up. Much as we desire permanent peace, can we mortgage the future by any ill-advised ac-

tion today? The man who lived through the years 1914-18 is firm in his convictions that such conditions shall not be, and he will take every step, compatible with national and internal safety, to see that the peace is kept, but he is wise indeed who can predict what the future may bring forth. The man of tomorrow will not feel toward the subject of war as those who live today feel. Time will erase the memories of the past. The worst contest in the annals of our history was the Civil War. This was an internal strife brought about through no external complications but arising within the country itself. Two great moral questions were involved. One was slavery and the other, shall we exist as a united country? Moral questions both, but the minds of the North and the South were so firmly fixed in the justice of their cause that war and much bitterness resulted. Who feels bitter today? Time has shed a mellow haze over this great struggle. Such a war may happen again, although the disputes over which we fight may be of a character no mind can foresee.

It would appear as though no fair judgment on our present problem could be passed without some slight consideration of war in general and of the forces which wage war. War may be external, that is, it may be between different countries. The present tendency is to view all wars as foreign and the steps now taken are those which tend to stop strife between nations. However, there are much worse things in the world than a foreign war and one is an internal strife where brother fights brother and where a country is torn by dissension within its own borders. We may be prosperous; we may make treaties outlawing war; we may agree to arbitrate so that the danger of a foreign war becomes reduced, but unless we lead national and individual lives, upright, liberal, just, and unselfish, we cannot promise ourselves that internal war shall not be. As President Roosevelt has said, there is no greater temptation for foreign encroachment than to be rich and impotent. If we lead lives of luxury and thriftlessness, and are careless of the welfare of our neighbor, we are laying seeds for future internal as well as external trouble.

Armies in one form or another, either in the tribe, clan, or nation, have existed since the dawn of men. Navies, although of a later growth, have existed since the days of recorded history. Generally speaking, their organization has been similar to that of armies. Originally, the navy of a country comprised all of its shipping, whether it was engaged in trade, warfare, piracy, or in any other maritime operation.

In reviewing, briefly, the subject of the formation and operation of armies and navies, it seems possible to divide European history into three outstanding periods. The first began about 500 B.C. and extended to around the time of the Renaissance, or let us say to about the fifteenth century. This period we will call the period of military influence. Beginning with the Renaissance, which was a rebirth of man, coming after the confusion consequent upon the breaking up of the ancient Roman Empire, European nations entered upon a fresh stage of vital energy. It was marked not only by the resuscitation of intellectual activities, but the then powers of the world pushed out beyond the confines of the Mediterranean and crossed unexplored seas, finding new lands to colonize and to exploit. A different order of things began, in military and naval matters, from this time. Military influence still existed on land, but this influence had to yield some of its paramount importance to naval influence. As trade with the colonies grew, means were found to protect the wealth flowing into Europe from possessions overseas. Navies grew in importance and shared on equal terms the power which had been wielded formerly by military force. It is true that at an earlier period, navies had played their part, as history points out, in the sea battles between Athens (always a sea state) and Persia, and in the use to which the Romans put their fleet against other sea powers in the Mediterranean, principally against Carthage. But the influence of sea activity in ancient days was limited to the Mediterranean. Now, after the Renaissance, we see naval forces in some form or another operating over the oceans which bordered the known world. The period beginning with the Renaissance and lasting down to the latter part of the last century rightly can be called the era of sea influence.

It was during this time that the greatest sea fights in history took place. Not only were operations minor in character and

directed against the trade of an enemy undertaken, but sea power was used directly against military power, as was shown in the Napoleonic Wars. The use of sea strength in this way persisted down to, and was used successfully against the Germans in, the last war, that is, sea power was used to break the back of military power. In other words, by exerting the pressure of the allied sea forces through the power of blockade the action of the military forces of the Central Powers on land was circumscribed.

Beginning with the latter part of the last century, extending to the present and on into the future, we see another influence coming to the fore which has a marked effect upon armies and navies. The age of industrial effort is here.

During the ancient period we find in Persia that their armies consisted of a permanent force or standing army to which levies were added when a foreign war was decided upon. In Greece we are told that the Homeric fighting men were tribal levies of foot. In historic times Greece became an assemblage of city states, each with its own citizen militia; federal armies and permanent troops were rare. In Sparta the idea of the nation in arms was carried out more thoroughly than in any other state in the history of the world. Every man capable of bearing arms was a soldier, the training intensive and thorough. To this day the thought evoked by the term "Spartan virtue" still retains some of its original force. For defense only, this form of military organization served admirably in the earlier Peloponnesian Wars, but later, when continuous service was required and distant operations were undertaken, mercenaries had to be secured, even to the extent of promising citizenship to enlisted slaves. In principle, the organization of the military forces of Carthage was identical with that of Persia and with that of Europe in the sixteenth and seventeenth centuries, but during the third century, B.C., Hannibal conquered with an army composed entirely of mercenaries, and Hannibal is called the equal of Napoleon. For the first time in the world's history, during Hannibal's campaigns, war was a matter with which the civilian population had no concern. Coming later to a consideration of the Roman army during the various periods of the Republic and the Empire, we see first, a national or citizen levy such as we find in the beginnings of all states. Second, this force growing into the republican army of conquest which gradually subdued Italy and the Mediterranean world. This citizen army of infantry, varying in size with the needs of each year, eventually developed into the military force of a fighting professional organization. The third stage was that of the imperial army of defense which was a garrison rather than a field army. The fourth stage was that of an army composed of both field and garrison forces. The history of the Roman army, so far as general organization is concerned, is practically the history of the military forces of every other world power which has existed since the days of the Roman Empire.

Coming now to an evaluation of the effect of a purely military influence versus sea influence, we may compare the Greeks, who were a maritime people, with the Persians, who were more essentially a military and land people. In Persia we find the antithesis of all that is characteristic of Greece. We find a military society organized on an aristocratic basis opposed to an industrial society animated by a democratic spirit. We see an army whose strength lies in its cavalry, opposed to an army in which the foot soldier alone counted. We note a morality where veracity is held the chief virtue, opposed to a morality where veracity is assigned an inferior place. We discover a religion which appeared to spiritual-minded Greeks as immoral and absurd opposed to a religion which ranks among the great religions of the world.

If then these things be true, it may be correct to make a difference between armaments used and dominated by the more autocratic and military influence, and those used and actuated by a more liberal and democratic environment. Certainly, coming to later times and reviewing those events with which we are all familiar, namely, the operations of the recent World War, we do find a more liberal attitude adopted by the leading sea power—Britain—than we can find in the attitude adopted by that great exponent of military prowess—Germany.

Coming to the formation of modern navies, we must yield Britain first place.

Its naval organization dates back to the ninth century, A.D. Originally it was organized for the defense of the coast; later it expanded until it reached, relatively, its acme of strength during the Napoleonic wars, when it achieved its greatest and most spectacular victories. The naval might of Great Britain persisted through the World War and down to the present day, when it acceded equal place to the American Navy.

In the main, during war the power of the sea has been used against military effort. While armies strive actively against each other and endeavor to bring about direct action in which force is opposed to force, navies, although endeavoring always to bring opposing fleets to action, are not as restricted in methods of operation as are armies. If, as during the last conflict, land forces may not meet similar bodies in decisive combat, then a form of entrenched warfare may come into being and something of a stalemate result. Not entirely so with sea power. Nearly all countries are bordered by the ocean and if it be not possible to bring the two fleets to action, a blockade of the enemy's coast line may be effected, resulting in a war of attrition, waged not directly against the inhabitants of a country but against its resources. This is the most liberal form of warfare and, to a certain limited extent, exists in the everyday peace life of the world, where trade competes with trade and industry against industry.

The French Navy had its inception when the French monarch, Philip Augustus, about the thirteenth century, began by expelling King John of England from Normandy and Poitou. It has run a variable course since then, but during Napoleon's time the needs of the French Navy were subordinated to those of the army. It has never recovered its full influence since that time.

The beginnings of the Spanish Navy are difficult to trace, but the discovery of America, and the acquisition by marriage and conquest of Sicily, Naples, and Flanders, gave the King of Spain a powerful motive for maintaining a strong navy, one object of which was to protect the caravels from America. This navy went through various vicissitudes, contesting the supremacy of the sea at times with Holland and England but, together with the French Navy, suffering an overwhelming reverse at Trafalgar.

The Dutch fleet rose out of the great struggle with Spain in the sixteenth century. It waxed and waned, at one time contesting successfully the supremacy of the sea with Britain. It, too, fell eventually before the might of England's sea forces.

The American Navy came into existence shortly after the Declaration of Independence. The War of 1812 was one of particular brilliance. In this war were won several of our most celebrated sea victories against individual ships of the British service, then relatively at the zenith of its power. Our Navy has, however, never until later years been kept up on the basis of any definite policy. It was less popular than the merchant service during the sailing-ship era, and so after 1812 was allowed to wane until the time of the Civil War, when the need for adequate naval force again became pressing. After the Civil War came the age of steam. Both our merchant marine and our Navy suffered a decline, and it was only when the great battleship program of 1916 was laid down, due to the feeling in this country that we would need an adequate naval defense if Germany won the war, that the American Navy came again into prominence. In 1922 at the Conference for Limitation of Naval Armaments, America again allowed its naval service to suffer a loss in numbers, but at this time the reduction was made purposely, and out of it there was evolved a standard of policy to which it is hoped our country will adhere.

The history of the German Navy is one of foresight, calculation, and steady growth until the World War. The modern German Navy dates from about 1871 when the Imperial Navy was organized from the small force maintained originally by Prussia. More will be said about this later when we discuss briefly the World War.

Although the Japanese have been always a maritime people their navy may be said to date from 1895, the eve of the war with China. Since that date its progress and increase has been steady and today Japan, although the last comer among the great naval forces of the world, ranks as the third power. Viewed historically, there is reason to believe that Japan, although ostensibly under an autocratic form of government,

will view her sea problems with the same degree of liberality which has existed always in the past in great sea states such as Athens and Great Britain. The men of Satsuma who control naval affairs have, since the formation of the modern state, controlled Japan's foreign policies. They are amongst the most liberal thinkers Japan has produced. It does not follow because a country may have at the head of its affairs a monarch, that in the conduct of foreign relations it may not be quite as liberal as those countries which profess a more democratic form of government. For example, England, which always has had its King, is one of the most liberal of the great powers. On the other hand, Russia, which today maintains the most radical form of government, is in reality one of the most autocratic. If it be possible to draw any conclusions from a review of history and from the different operations of war which have been undertaken in the past, it would appear as though those countries whose fate depended upon sea power have at heart been liberal thinkers and lovers of true democracy, whereas the more strictly landlocked nations have been more circumscribed in their attitude, have been governed more by what may be called military influence, and have been exponents of the more autocratic forms of government. Even if this viewpoint be not fully subscribed to, nevertheless it is a point worth considering, for it has a distinct bearing upon the question of armaments and the limitations which may be applied to them in the interests of better world understanding.

Let us return to a brief review of European history in its relation to the question of armaments. While there have been many great men in every country who, through their policies, have influenced armaments, there are two writers whose thought has had a distinct effect upon the trend of European politics and military conduct. These two men, Machiavelli the Florentine and Grotius the Hollander, were the exponents of two different lines of reasoning. The year 1494, the date of Charles VIII's invasion and the expulsion of the Medici from Florence, saw the entrance of Machiavelli first into public life. Although a patriot, his close association with Cesare Borgia led him to conceive an admiration for this peculiar character, for he approved of Borgia's combination of audacity with diplomatic prudence, his adroit use of cruelty and fraud, his self-reliance and his avoidance of half measures. Machiavelli's principal works, coming at the end of the period of medieval thought, are an analysis of the methods whereby an ambitious man may rise to sovereign power, and illustrate his conception of the state studied under two main types of government, the monarchy and the republic. He, in opposition to the trend of modern thought, severed ethics from the field of politics and he discounted the effect which religious inspiration may have in the guidance of state affairs. His writings influenced the state politics of the time, were reflected by writers even down to the World War, and affected the conduct of the military forces organized to put into effect national policies. He was an advocate of the rule, "the ends justify the means."

Hugo Grotius, Dutch publicist and historian, during the sixteenth and seventeenth centuries, on the contrary, advocated a different line of thought. A man deeply religious in his convictions, he maintained a far more liberal point of view and one more in keeping with the trend of modern thought than that outined by Machiavelli. Grotius insisted that the sea is not private property but free to the use of all nations. Some of his works form the basis for modern international law. His writings have affected profoundly naval warfare and, coming at the time when the age of exploration and colonization, the age of sea influence, was beginning, had a lasting effect upon many of those naval powers striving for control of the sea. In contradistinction to the writings of Machiavelli, his thought has, since the World War, received added impetus, for it is in keeping with the trend of modern ideas. If possible to sum up in a few words the tendency of this thought, perhaps it is outlined in this expression, "the ends must be justified by the means."

The American way of reasoning, though a product of European thought, has run a course all its own and one quite unique. The Reformation possibly may be called the father of American religious thought, for it influenced the Separatist movement which brought the Pilgrims to our shores. This

undertaking, a strictly religious one, and differing from the other colonizing movements to America, probably had a greater influence in the formation of our government and upon the national character which we have attained since, than any other one thing. The ideals, convictions, and practices of the Pilgrims, who were, for the times, liberal and tolerant men, are largely responsible for the ideals expressed in our Declaration of Independence and for the soundness of the statutes written into our Constitution. We owe to them three distinct national traits which have crept into our public life and which affect unconsciously our attitude toward others. Born out of the Congregationalism of the old meeting house, these are the willingness to settle not only religious but public affairs through conference, the willingness to arbitrate, and the missionary movement. If then, these statements be true, and they would seem to be, it might indicate why our attitude toward things military and toward armaments cannot be quite the same as European thought on the subject.

The Oriental, mainly an agriculturalist, and in the past not an industrialist, a man living on and by the products of the soil, closely akin to Mother Earth, must have a trend of thought which differs from both the European and the American way. He is an unknown quantity, so far as the future is concerned, but that he derives strength and tenacity from the soil and the power of perpetuating his species no one can gainsay. At present he is in the throes of evolution and revolution. If, in the future, emulating the leading nations, he turns his activities to industry rather than to agriculture, it is a wise man indeed who can say what the future may bring forth. But that the Oriental is strong potentially and a power to be reckoned with, wisely and justly, sane men must recognize.

The World War marked a turn in the world's history and we must read its lessons aright if we would profit in the future. In the doctrines expounded by the latest German writers before the World War we see the influence of Machiavelli. A late comer in the field of exploration and colonization, and not realizing fully the power she might wield peacefully in the coming industrial age—for at the time of the World War Germany was one of the industrial leaders—we find German military thought, in the endeavor to give their country the same place in the sun held by nations more favored, an advocate of the policy that armed force should be used to back political design. The conflict following was, in a measure, a question whether liberal sea influence should prevail over conservative military influence. Tenacious of what they thought to be their rights, and desirous of fighting to the end in their endeavor to avoid the pressure of the blockade instituted by the sea forces, the war dragged on, until from a conflict somewhat limited in its aspects and confined to the continent of Europe, it became a war involving nearly the entire world. It developed into an unlimited struggle of dreadful aspect in which neutrals were drawn in as well as the original belligerents. The difference between the action of the Allies and that of the Central Powers may be summed up briefly: while the Allies took action in reprisal against material, the Central Powers undertook reprisals against personnel, with the result that practices long discountenanced under the Law of Nations once more came into existence, carrying us back to the age of the barbarians. Limited war, which had been the tendency of modern Europe, now, due in a measure to the scientific and industrial advances of the present age, took on an unlimited character and it became the most fearful of all modern wars. Enlightened thought insists that war, if it be impossible to avoid it, must be limited in character, and that civil war shall be avoided at any cost by advanced and humane social and economic conceptions and through a proper adjustment of internal affairs.

Explanation of the Methods Used for Limiting Armaments

First, there is what may be called limitation of armaments through attrition. This method has been used for many centuries. When war is on, the armed forces of a country are built up to an extent not necessary in peace. The surplus armaments, when peace is made, are allowed to pass out of existence, the personnel are disbanded and the material laid up in reserve or sold. This is the normal and natural working of

the factor attrition and must always happen because it never should be necessary to maintain at all times the same huge armaments we are obliged to maintain in war. But there is another phase which is not normal, although it is one advocated by extreme pacifists, that is, to permit all armaments to pass out of existence, leaving the country denuded of any form of national defense. In the past the method of attrition has been carried almost to the extreme of entire unpreparedness, even in the face of growing national danger. Attrition carried to the degree some might wish would reduce our forces to the extent that probably we could not maintain the policing of the seas or insure the integrity of our trade routes. Were this condition permitted to arise in the future, even though actuated by the most altruistic motives, a situation would be created which might seriously affect the national safety. At times, within our own borders, it has been necessary to call out the federal forces to maintain law and order, in districts where internal dissension has arisen to such proportions that the local police and state militia have not been able to cope with the situation. At sea, without an effective federal police, for the national sea forces are the only forms of police force permitted to work in the open ocean beyond the three-mile limit under the rules of international law, piracy might reappear and many unlawful practices be carried on. On land, as all of the inhabitants of a country do not belong to the law-abiding class, a too great attrition of our military forces might lead to the formation of organized gangs of lawbreakers which it would be difficult to control through the operations of the militia of the different states, for they have not the freedom of action of the federal military forces. It has been necessary in the past to call upon the services of the marines to protect the United States mail and valuable merchandise from the operations of organized bands of train robbers. The method of limitation by attrition has been the normal method adopted in the past to reduce our federal forces, particularly the Navy. After the War of 1812 and the Civil War our Navy was allowed to decay until it was reduced almost to nothing. This method, while sometimes based on the law of supply and demand, is, in view of our increasing world interests, a rather dangerous one to follow, for a democracy has not the power to marshal quickly its military strength in time of need with the same celerity that a more autocratic form of government has. Moreover, since it takes a period of from three to four years to build a major naval ship, a period of impotency might result during which the federal state could be placed at a disadvantage if the upkeep of the Navy was not maintained at a reasonable standard. The way of attrition maintains no standard of policy but was the one adopted by our country up to the middle of the World War. In 1914 our naval forces were so far reduced that had the Central Powers succeeded in obtaining an early victory our nation might have been seriously menaced. An attempt was made to remedy this situation by drastic enactments in 1916, but from 1914 to 1916 this country was in a state of unpreparedness to meet world conditions had they assumed menacing proportions. In 1922, following the Conference for Limitation of Naval Armaments, the method of limitation by attrition nominally passed out of effect, and a new way was brought into being, namely, limitation by technical process, where certain standards of naval power were fixed to which we are supposed to adhere.

Another form of limitation of armaments is that of reduction by example. This method also has been advocated by those who hold extreme pacifist views. Following it to a logical conclusion it would seem to end practically in complete disarmament. An example of this form of reduction is afforded in the results achieved by the Conference for the Limitation of Naval Armaments which was held in 1922. Under the terms of the American proposal this country relinquished some three hundred and twenty millions of dollars and ultimately eleven ships, against which no other country made a commensurate sacrifice. There was, however, a very definite reason for so doing, but the reasons which actuated us then probably would not obtain again. We were becoming easily the leading naval power and a condition of unrest, partially due to the building of huge armaments, existed. Therefore, in the interest of better understanding and to avoid excessive costs, we did agree to make material sacrifices in armament which, while not carried to an

extent highly prejudicial to public safety, nevertheless can be classed under the term "limitation by example." Should this form of disarmament be carried to extremes, a situation prejudicial to public safety would be created.

There is another form of limitation which automatically comes into being through alliances or, using a common expression, by pooling the issues. America has never looked favorably upon alliances nor does it wish to pool the conduct of its foreign affairs with other nations. The policy of keeping clear of entangling alliances dates back to the time of the formation of our federal union and is firmly ingrained in the minds of the mass of the American people. Whether, under the present world conditions, this is a wise policy is not a matter for discussion. At present it is our policy and since it has received the sanction of the majority of our voters it must be adhered to by good federal servants. An example of this type of limitation could be afforded under the military sanctions governing a league of nations. It is true that an international police force may be less costly to keep up than to maintain separate national armaments but the practical defects attendant upon the actual operations of an international police force might be many and serious. While possibly not coming quite within this category of limitation today, the decree establishing the British Commonwealth of Nations all practically on an equal footing might be cited as one of the most enlightened and sound projects of modern times. While the states forming the British Commonwealth of Nations have not pooled the military assets yet in equal proportions, the United Kingdom still being left to bear the brunt of the burden, nevertheless in the future a state of affairs may arise whereby the military loads may be distributed more evenly. This firm of business partners amongst English-speaking people is one which must enlist the sympathies of the American people, for it is quite in keeping with our methods of conducting the everyday business of trade and industry. While *in toto* the bulk of armaments may not be decreased, the burden placed on any one of the partners should be less, and where the interests are the same, harmony is bound to follow. Another example of this form of limitation may be cited under the terms of the Locarno Treaties, where, under the guaranty against aggression, not only is protection afforded but the burden of maintaining individual armaments is reduced.

We now come to that form of reduction which was invoked through the Conference for Limitation of Naval Armaments in 1922. This method has certain peculiar characteristics. It was not invoked through alliances, but was a method applicable to each individual naval power participating in the conference, and was made to apply directly to material. It will be called "limitation by technical process." The personnel feature was not touched but was automatically decreased as the material armaments were reduced. This method of limitation was not entirely new. In 1902 Chile and Argentine, due to friction which had arisen between them, agreed to restrict all further naval armaments for the next four years. In 1906 both countries, influenced apparently by the activities of Brazil, placed large orders in Europe for new vessels, so that when the conference met in 1922 there was then no existing example of limitation by technical process. Out of this conference some definite results were secured, even though the entire purpose of the American proposal was not achieved. The 5-5-3 ratio in battleships and aircraft carriers was attained and, while this ratio was not made applicable to lesser craft such as cruisers, nevertheless the spirit of the proposal was supposed to be maintained by the great naval powers. The purpose of the conference was to reduce friction due to competition in naval building, to reduce costs, and to establish a stable condition of affairs in the Far East. For the first time in our history we had a definite naval standard, for as a result of the agreements the Navy Department was able to lay down a naval policy based on the 5-5-3 which it has endeavored to live up to. To those who originated it the 5-5-3 had a meaning deeper than that which can be given to a reduction of material things. It went further, for in a measure it was supposed to represent what it was believed should be the naval position of the three great sea powers relative to their world position as states, their potential power, wealth, and resources. From

the American point of view it was a generous offer to make. Nevertheless, this gesture had much effect in promoting harmony and if lived up to in its entirety, in spirit as well as in law, should be an instrument in preserving international peace, for it is practically a balance of sea power held in the hands of the now greatest naval states. It carries with it obligations as well as restrictions and one of the obligations on our part is to live up to it as well as to act down to it. For if America does not adhere to the conditions established, the present balance of sea power will in the future be changed and a condition of affairs may arise differing but slightly from those which existed before the World War. One of the particularly non-agressive features was incorporated in Article 19, whereby in the Far East the nations concerned agree to maintain the *status quo* relative to fortifications in their island possessions in the Pacific. Whether or not America made material sacrifices detrimental to the public interests is not a point for discussion. It was the view of our statesmen, looking far into the future, that this would be a wise thing to do in the interest of world peace and whether naval men (who always must consider themselves the sea guardians of our public welfare) like it or not, it is the law, and must be lived up to conscientiously. Another attempt made was to limit the activities of submarines. By the terms of the treaty drawn up submarines may not be used as commerce destroyers. This treaty has not been put into full effect for France, one of the contracting parties, has not subscribed yet to the terms of the submarine treaty. No attempt was made to limit military and naval air forces as it was thought then impracticable to limit in a material sense military and naval aircraft. However, contrary to the opinion held by many prominent airmen, there seems to be no logical reason why the operations of military aircraft should not come under the existing rules of international law now applicable to surface craft. If we do not definitely limit air operations, and this is considered by some the danger point, there is the possibility that aircraft in another war may get out of hand and be used against the civil population of a country in much the same way that the submarine was used in the last war. Viewed from this angle, under the conditions of unlimited air operations, there seems little prospect for containing war within definite limits whereby fighting may be confined strictly to the active military and naval forces of a country, which is the intent of international law. Under the conditions of unlimited air warfare a situation easily might arise under the cloak of reprisal which would cause the entire war to become unlimited in character, a thing most undesirable. The conference provided for a future meeting in ten years. In 1927, on the proposal of President Coolidge, a conference was called at Geneva to see whether the terms of the 5-5-3 agreement could not be put into full effect. As is well known, no definite results were achieved. We are today exactly where we stood in 1922. The discussion waged around "global" which means "total tonnage" versus limitation of tonnage by classes. There arose between the British and American delegates differences of opinion relative to limitation in the cruiser type, which were not adjusted. While the British agreed in principle to equality in sea power, the technical differences in adjusting the tonnage of the cruiser type were such that no agreement could be arrived at. The real crux of the matter lay not so much in the technical differences involved as it did in the diverging views held by British and American naval men in the matter of neutral and belligerent rights in time of war. It is an easy matter to see that a country living by the sea would not desire to have its source of supply interfered with in war time, for a nation which is dependent upon the sea must continue its existence even in time of war. Not only is this true, but in a war of attrition the power of the sea is invoked through the process of blockade, in some form or another, to wear down the enemy. It would be extremely unprofitable and would lead to an extension of the war, if neutral rights prevailed over or equalled belligerent rights in definite areas set aside as war areas in which, as some think, the belligerent should have rights vastly superior to those of the neutral. On the other hand, the American point of view has always been maintained, that with the exception of contraband goods, the neutral should have the right to trade freely with both belligerents in time of war. A too great accentuation of either

viewpoint is bound to cause friction, as was the case in the last war when our attitude toward neutrality and the British view toward belligerency became the source of many diplomatic disputes. After all, it comes down to the question of what each nation believes to be its moral rights rather than its legal rights. Trade with an enemy whom we believe to be morally in the wrong cannot be called good practice. On the other hand, to exercise belligerent rights at the expense of neutral trade, where such procedure appears to have no military justification, equally is wrong. Practically, the exercise of belligerent rights at the expense of neutral rights in certain well-established war areas does have the tendency to shorten the war and it removes the taint of selfishness which can be used against neutrals who may profit from a protracted war. The Geneva Conference resulted in arousing interest in our naval status, and in so far as we are concerned, an attempt to secure increased appropriations to be applied to the building of cruisers in order to bring our establishment up to the terms of the 5-5-3 ratio. We, as a people, began to realize that we had a duty, under the terms of the 5-5-3 agreement, to maintain our naval position as set forth, in spirit at least, by the treaty we had entered into.

Other factors which necessarily affect limitation of armaments are treaties to outlaw war, treaties of conciliation, and treaties of arbitration. The attempt to outlaw war through treaty is very modern and novel. The ultimate result desired, it would seem, is to create an attitude of international mind which will prevent war from being started. In the late French proposal two points were made. One was that the contracting parties renounce war as an instrument of their national policy toward each other, and the second was that the settlement or the solution of all disputes or conflict of whatever nature, or of whatever origin they may be, which may arise between France and the United States of America, shall never be sought by either side except by pacific means. This treaty will not be discussed as it is fully outlined in an address made by Mr. Kellogg, Secretary of State, before the Council on Foreign Relations in New York, March 15, 1928. There he outlined clearly the policy of the United States in the matter. The enactment of a series of multilateral treaties outlawing war between countries having similar interests would have a radical effect upon the question of armaments. They might be reduced to certain proportions. However, as to whether treaties explicitly renouncing war or treaties of arbitration and concilation constitute a guaranty against war, it might be well to quote from the address given by Mr. Kellogg:

> I must not claim that treaties of arbitration and conciliation or even treaties explicitly renouncing war as an instrument of national policy, afford a certain guaranty against those conflicts between nations which have periodically broken out since the dawn of world history In addition to treaties there must be an aroused public conscience against the utter horror and frightfulness of war. The peoples of the world must enjoy a peaceful mind, as it has been said, and treaties such as those I have discussed this evening and the efforts of statesmen to advance the cause of world peace can only be regarded as a portion of the problem.

That all treaties to outlaw war, except possibly, those between the great nations, would succeed in accomplishing their design, is open to question; certainly they would have little effect in stopping internal disturbance. Some of the countries subscribing to treaties outlawing war are among the smaller powers of the world. They have entered into more agreements of this character than have the great powers and yet within the borders of one of them at least, internal strife lately has been waged, as shown by the situation in Nicaragua.

To effect treaties of arbitration and of conciliation has long been the American practice. Perhaps it has been on account of the implicit faith in the efficacy of these instruments that the American attitude in general toward war and armaments has been what it is. It is quite true that if a cooling-off period is given through the agency of arbitration, the probability of war and the use of armaments is lessened. Even if we fail in arbitration we may still resort to conciliation. The World Court is probably the most highly developed example of an institution before which nations can submit adjustment of their disputes with a fair degree of assurance that the judgments rendered will be impartial and efficient. But this institution was preceded by hundreds of arbitration treaties, beginning with the Jay Treaty of 1794, arranged with England. At that time it

was the most modern experiment in international arbitration. It goes without saying that the greater the confidence we can place in treaties of arbitration and conciliation the less will we be obliged to resort to the use of armed forces in the settlement of foreign disputes.

THE EFFECT OF DISARMAMENT UPON THE NATIONAL DEFENSE

Today America is disarmed practically relative to foreign powers, as to her military forces. Except for minor uprisings it would be impossible for us to wage an aggressive war. Even in the defense of the homeland, in case such a contingency, however improbable, should arise, great national exertion would have to be made to place us even in a position of mediocre strength. To reduce our military armaments further might be to leave us a prey to internal dissension.

In the matter of our sea forces, so long as we maintain the standard 5-5-3 set as a fair and just measure of our naval power, the position of America seems fairly secure.

The effect of complete disarmament on America's naval forces while other great powers maintain their naval strength would be to place our relations outside the nation's borders at the mercy of others should they choose to exercise their strength. They might never care to do so, nevertheless, the potential ability would be there.

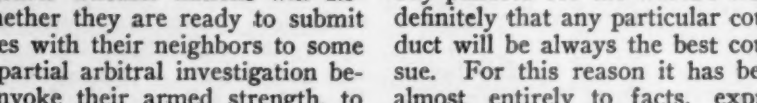
The effect of complete disarmament of the great powers would be to leave them at the mercy of the smallest who did not choose to disarm. In this connection it is felt that the following is not an unfair statement of the case. The real question is not altogether whether nations will disarm but whether they are ready to submit their disputes with their neighbors to some form of impartial arbitral investigation before they invoke their armed strength, to act justly by other nations in the light of the results, and to scrutinize fearlessly and honestly the purpose for which alone they will allow their armaments to be used. Small armaments, if used for selfish or aggressive or willful purposes, may be a menace to world peace. Large armaments, if unselfishly and intelligently used in support of arbitration and justice, may be the preventive of war and a real bulwark of peace.

Limitation of naval armaments on a definite basis is a practical thing. It is conducive to harmony and better world understanding. If lived up to it tends to preserve the balance of power necessary to the equitable conduct of foreign affairs and trade relations with countries situated overseas.

Until a higher degree of national and individual altruism exists in the world than is present today, the need for some naval armament will be present always.

Attempting to visualize the future most briefly, in the light of the past, what do we see? The material world has broadened out, but nations and peoples still struggle in competition with each other, in order to attain or maintain positions of vantage. In the new era of industry there are in times of peace forces working in competition with each other which, unless harmoniously adjusted, lead to clashes internal and external. If we view our problems from the broad angle and act in the liberal and fair way, great crises may be postponed and perhaps avoided. If, on the other hand, we take the narrow and limited point of view and act in arbitrary and selfish ways, strife in some form surely will arise, and strife then, as has been ever the case in the past, will be settled by a resort to arms.

This paper has followed the thought outlined above, with no attempt to prescribe any panacea for the world's ills or to state definitely that any particular course of conduct will be always the best course to pursue. For this reason it has been confined almost entirely to facts, expressing few opinions but leaving the reader to draw his own conclusions.



Making *a* Smart Ship

By LIEUTENANT (J.G.) S. R. BEDFORD, *U. S. Navy*

WHILE walking through the crew's quarters one day, I overheard one bluejacket say to another: "Hank's a fine bosun's mate", to which the other replied, "Well, you know the reason, he's from the U.S.S. *Blank*." That remark interested me, because I had been on the *Blank* not long before, so I paused to hear the rest of the discussion. "What does being from the *Blank* have to do with how good a bosun's mate he is?" piped up a third lad, and the answer to that question was very much as I had guessed it would be: "Every man that we have ever received from the *Blank* has been a crackerjack, whether seaman or petty officer."

Those remarks set me to thinking, and my conclusions on the subject were that things done right on one ship not only benefit that particular ship, but surely and gradually spread their good influence throughout the entire Navy.

During a comparatively short space of time, the personnel of a ship undergoes an almost complete change. The officers and men are soon scattered throughout the Navy, and, if they are well and thoroughly trained, they cannot help but carry with them those same ideas of efficiency they have learned in the ship they have just left. Of course, everyone knows this but, due to the press of gunnery and engineering and various other tasks, many details which go to make up a smart ship and smart men-of-war's men are allowed to slide. In many cases these details, of which I shall mention a few, are set aside because they are considered nonessentials, or are too much bother to the division officer concerned.

Of these details the more important are: bag and hammock inspection; housing awnings; appearance of people on watch, and the manner in which they carry out their duties; preparation of surfaces for painting; appearance of people at morning quarters; saluting the quarter-deck; etc. Taking these items in order: division officers too frequently inspect bags and hammocks merely with the idea of ascertaining whether or not the man has sufficient clothing and bedding, and the condition of its cleanliness. He does not, unless admiral's inspection be just around the corner, insist that the clothing be taken out of the locker and properly laid out for inspection in accordance with the book, and the men become just that much more lax for being able to "get away with it" in such a small detail as that. Next in order, each ship has its own hobbies regarding the proper housing of awnings, merely because the division officers or other officers do not take the trouble to insist that it be done properly, and allow the men to do it as they think best. Few messengers deliver their messages on the double, and few men "snap to" immediately when being addressed by an officer.

Every first lieutenant knows that surfaces are too frequently painted without the proper preparations being made. This is partly due to lack of personnel, and the fact that all divisions are operating at from 40 to 70 per cent of their necessary and allowed complement, and that, were all of these little items attended to, the work would never be half completed, for lack of man-hours necessary to accomplish properly the task; but nevertheless, much more could be done, and more efficient results could be accomplished with the same number of man-hours, were the division officer to spend more of his time on the little details, than the more important tasks of daily routine.

Except under the press of a forthcoming admiral's inspection, men and officers too frequently are allowed to straggle to their general quarters stations, or to general drills, and a corresponding loss in efficiency results. Few men salute the quarter-deck, when coming from below, and many of

the division parades too frequently resemble mob scenes instead of smart, orderly, seamanlike formations.

I might continue *ad infinitum* and *ad nauseam,* for everyone can think of these little things which, in the busy hours of ship and gunnery drills, are only given secondary consideration, and division officers, officers-of-the-deck, petty officers, and others who do concentrate on the little things invariably give up in despair, as they can't fight a lone battle with everyone saying: "Why, that division doesn't do this, or that; and that O.O.D. doesn't require this, etc.", too numerous to mention.

The gist of the whole matter is as simple as it is effective. It requires no more effort to do things properly than it does to do them half-heartedly and slackly, and in most cases less. Once officers and men get in the habit of being smart and shipshape in the little things, the big things will take care of themselves. "As the twig is bent ....." most certainly applies with full force in our modern "speed, dash, and accuracy" fighting forces afloat, where results are attained from constant and determined effort that has only to be rightly applied to accomplish effects that will not be confined to the one ship alone, but will spread throughout the entire fleet until smartness in the little things will be recognized as absolutely necessary, and as indispensable as it now is considered unnecessary.

Courtesy Rear Admiral W. T. Cluverius, U. S. Navy

NIGHT FIRING?

No, just an odd effect produced by photographing a negative.

By Burton Holmes. From Ewing Galloway

BARCELONA, FIRST PORT OF CALL OF THIS YEAR'S MIDSHIPMAN PRACTICE SQUADRON
View of harbor from Montjuich.

By Burton Holmes. From Ewing Galloway

BARCELONA, FIRST PORT OF CALL OF THIS YEAR'S MIDSHIPMAN PRACTICE SQUADRON
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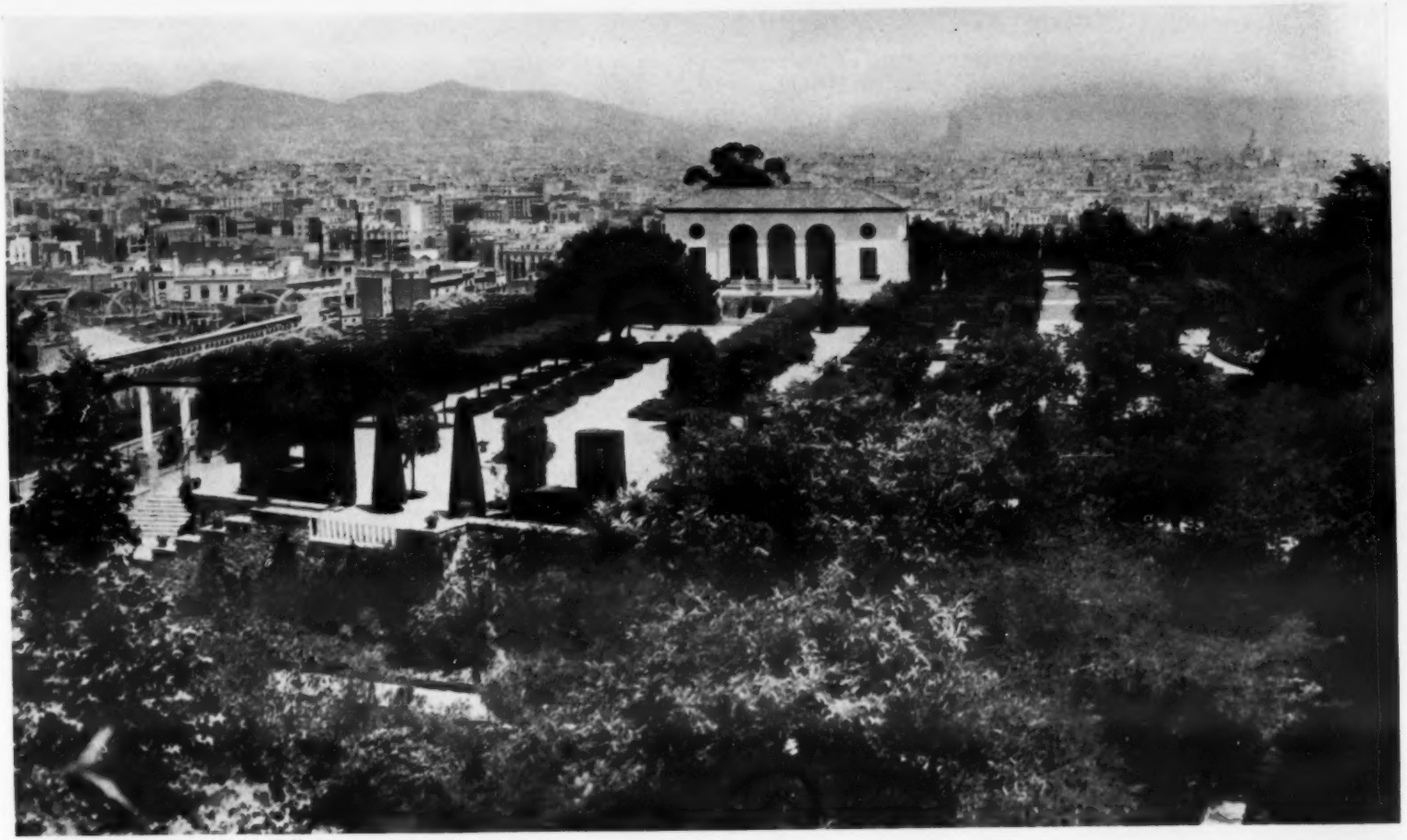
By Burton Holmes. From Ewing Galloway

BARCELONETA (LITTLE BARCELONA)
The principal bathing beach of Barcelona, Spain.



By Burton Holmes. From Ewing Galloway

BARCELONA, SPAIN
Exposition gardens on the slope of Montjuich.

BARCELONA, SPAIN

Exposition gardens on the slope of Montjuich.

From Ewing Galloway, New York

BARCELONA'S EXPOSITION THIS YEAR IS HELD AFTER TEN YEARS OF PREPARATION

The Palace of Agriculture is one of the many large buildings. Both Barcelona and Seville are holding big expositions this year, and will be the means of attracting many foreign visitors to Spain. The expositions are intended to stimulate trade between Spain and other countries.

By Ewing Galloway, New York

BARCELONA IS A PICTURESQUE CITY AS WELL AS SPAIN'S LEADING TRADE CENTER
The Plaza de la Gatuluna is a beautiful little park in the heart of the main business district.

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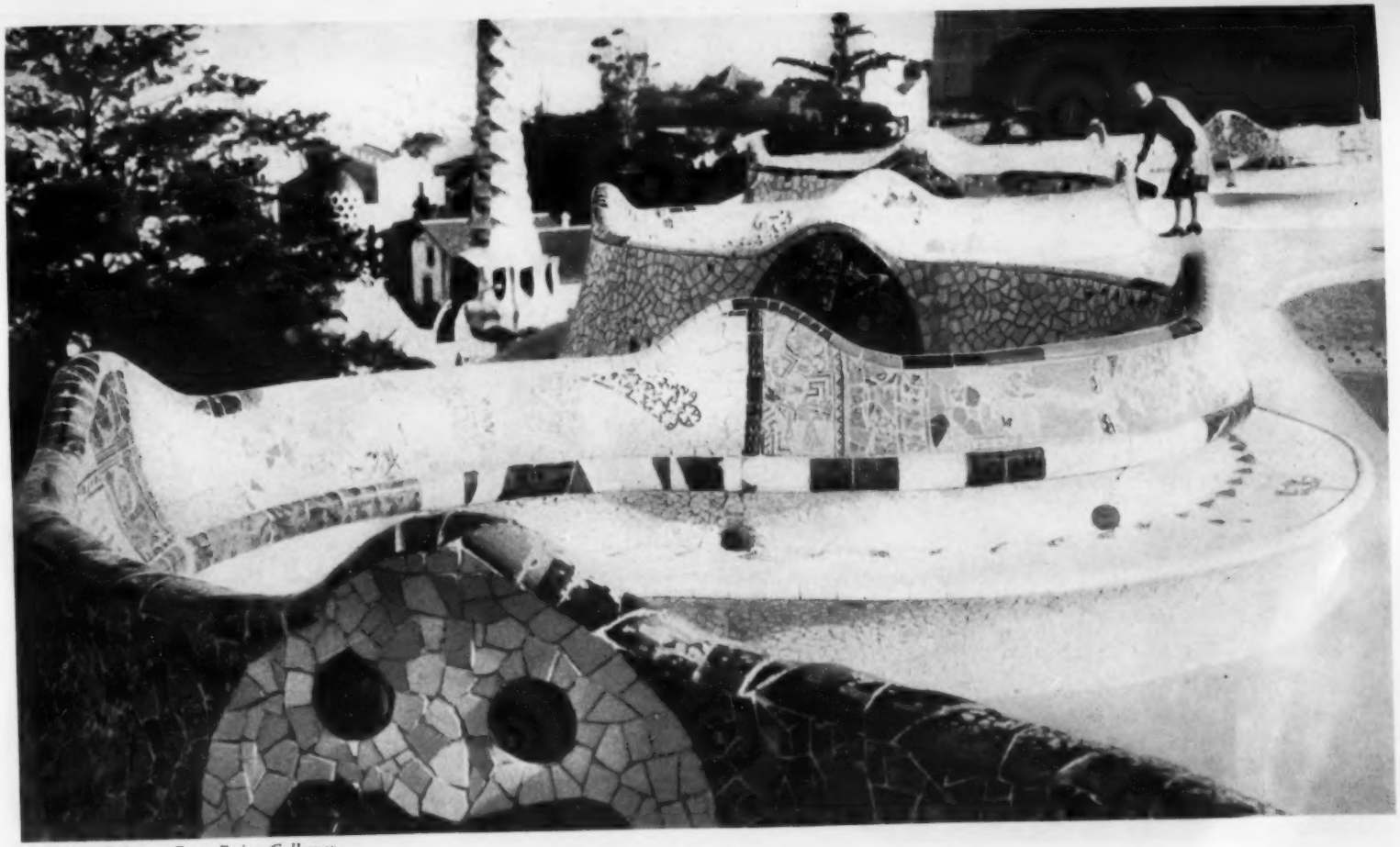


By Burton Holmes. From Ewing Galloway

PARQUE GUELLE, BARCELONA

By Burton Holmes. From Ewing Galloway

PARK CASCADES, BARCELONA

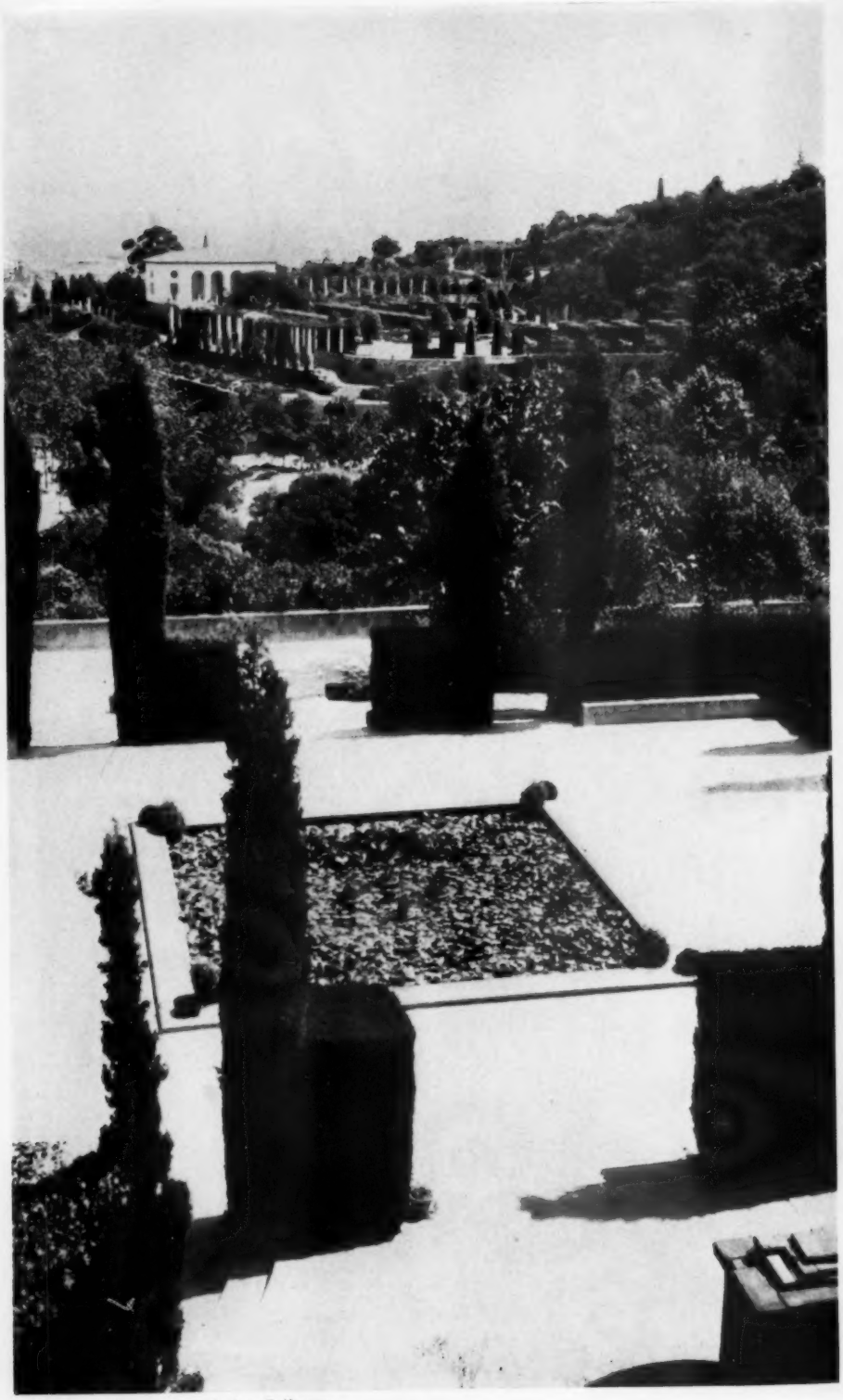
By Burton Holmes. From Ewing Galloway

PARK CASCADES, BARCELONA

De Cou. From Ewing Galloway, New York

BARCELONA IS HOLDING AN EXPOSITION OF IMPORTANCE THIS YEAR AND WILL ATTRACT MANY TOURISTS

This is the beautiful *paseo* or walk known as La Rambla del Centro. Shady and cool, this promenade is a center of Barcelona life on a summer day.

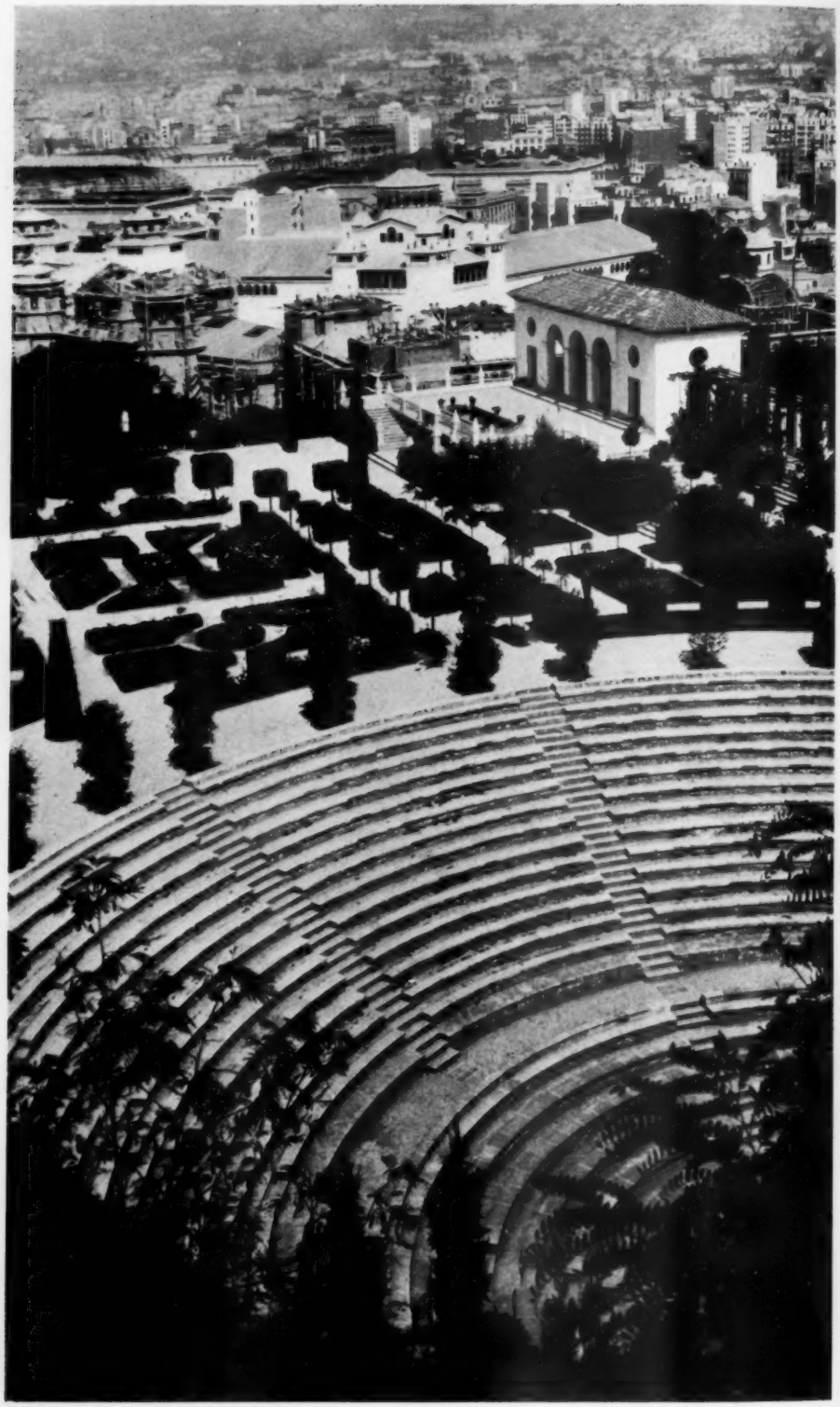


By Burton Holmes. From Ewing Galloway

BARCELONA EXPOSITION GARDENS

By Burton Holmes. From Ewing Galloway

THE COLUMBUS MONUMENT, BARCELONA



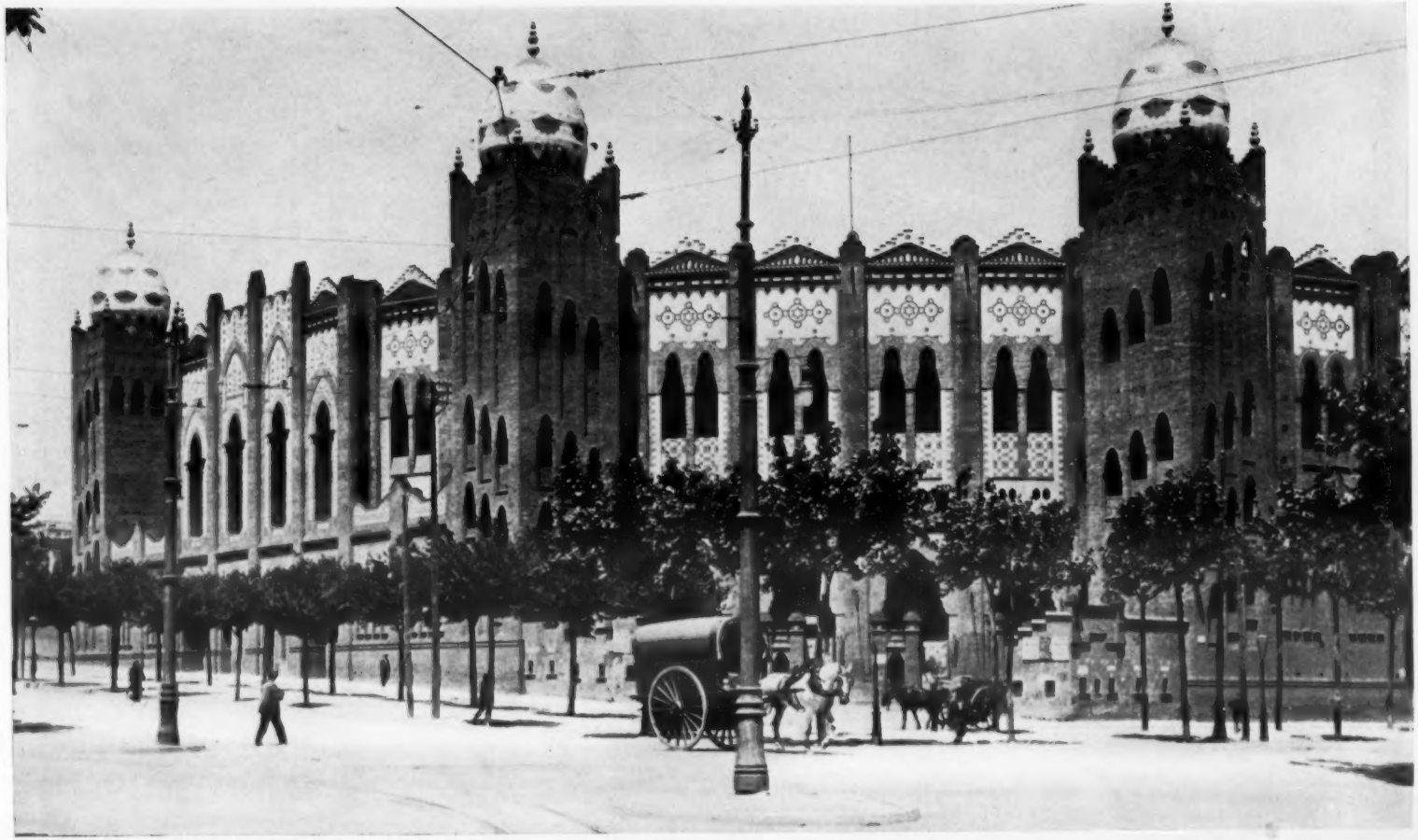
By Burton Holmes. From Ewing Galloway

GREEK THEATER IN THE EXPOSITION GARDENS IN BARCELONA

By Burton Holmes. From Ewing Galloway

BARCELONA, EXPOSITION CITY OF 1929

The four columns, standing in front of the Spanish government building in the exposition group, are one of the outstanding architectural attractions of the big show.



By Burton Holmes. From Ewing Galloway

BARCELONA, EXPOSITION CITY THIS YEAR, HAS AN IMPOSING BULL RING

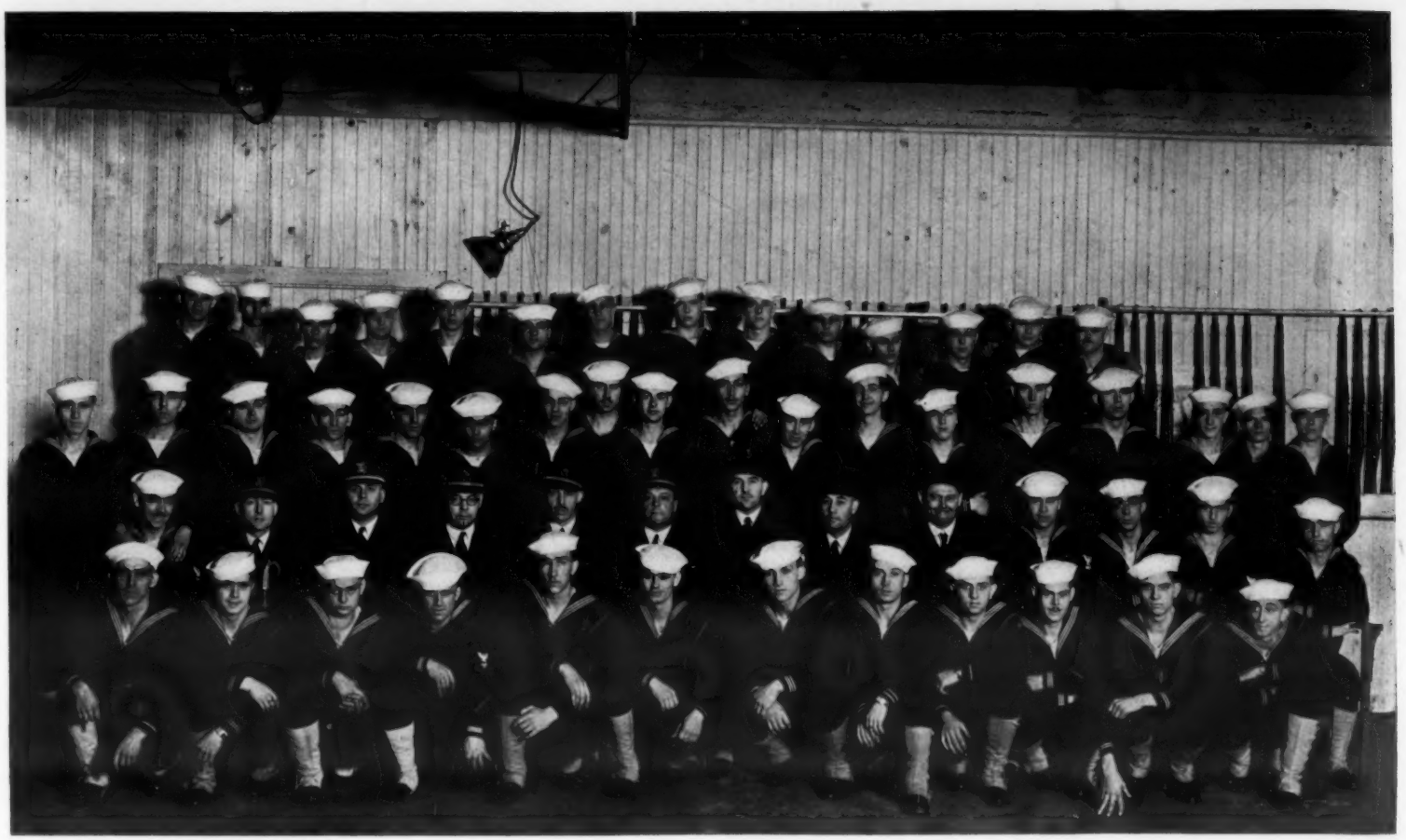
By Burton Holmes. From Ewing Galloway

BARCELONA, EXPOSITION CITY THIS YEAR, HAS AN IMPOSING BULL RING

Courtesy Commander R. F. Frellsen, U. S. Navy

PARTIES OF MIDSHIPMEN VISITED ROME

Interior view of the Coliseum. Usually the exterior of this famous arena is more familiar.



Courtesy Lieutenant G. W. Akers, U.S.N.R.

NINTH DIVISION, U.S.N.R., OF DETROIT, MICHIGAN
At annual inspection, April 29, 1929.

As *the* Navy Views *the* Merchant Marine Naval Reserve

By COMMANDER WILLIS W. BRADLEY, JR., *U. S. Navy*

EVEN the most casual thinker about things maritime realizes that, for any extended operations, the strength of the fleet must take into consideration many factors other than actual fighting ships and their complements. Fuel, foodstuffs, general supplies, and ammunition, must be delivered when and where desired, and in needed quantities. Miscellaneous ships of many kinds must be improvised and provided for the use of the commander in chief. Naval personnel must be transported to and from the base of operations. Troops may have to be moved in great numbers. To carry out these auxiliary tasks will require a large number of merchant vessels under the immediate control of the government of the United States —in all probability, under the direct supervision of the Navy Department.

It is a matter of the greatest importance for the safety of the nation that there shall be an adequate merchant marine under the flag of the United States, but, since this paper deals primarily with personnel, that phase of the question will not be discussed in detail. However, the establishment of a large and efficient Merchant Marine Naval Reserve depends directly upon the maintenance of an adequate number of ships under the American flag, for the personnel cannot be developed, commissioned, enlisted, or what not, without ships upon which to serve. The law does not permit the Merchant Marine Naval Reserve to become an organization of city-dwellers or rural husbandmen.[1]

For the purpose of discussing the organization of this new branch of the Naval Reserve, it must be assumed that the ships exist. The task presented is to take such measures as will assure the nation of their most efficient use in time of national emergency. It is apparent that the ideal condition from the Navy's standpoint would be to have all merchant vessels immediately available for use as adjuncts to the fighting forces and to have each vessel manned with officers and men trained in the Navy's methods of conducting business on the seas and subject to the orders and discipline of the Navy Department. Such an ideal is, of course, impossible of achievement. The best that can be done is to make a beginning and to go as far along the way as existing conditions both in the Navy and in the mercantile world will permit.

In a previous article on this same general subject, the writer described the relations between the Navy and the merchant service in the following paragraphs:[2]

> In the beginning, we may as well recognize that the Merchant Marine Naval Reserve problem is one properly referred to as triangular. It has three distinct sides or faces, each one somewhat opposite to the others, yet joined to them in an inseparable way. Like the triangle, if we remove one side, the others are of no avail for they cannot constitute the whole. The three sides of the problem, each representing one of the great elements concerned, are, the United States government (represented by the Navy Department), those American citizens who make their livelihood upon the sea, and the owners and operators of merchant vessels under the American flag. While each of these recognizes the needs and desires of the others, it must keep its own necessities paramount and ever in the foreground.

[1] Section 30 of the Act of February 28, 1925, reads as follows: "That the Merchant Marine Naval Reserve shall be composed of male citizens of the United States and of the insular possessions of the United States who follow or who have followed the sea as a profession and who are employed, or who have been employed within three years, on public vessels of the United States or such other seagoing vessels documented under the laws of the United States as may be approved by the Secretary of the Navy."

[2] From an article prepared by the writer for the *Neptune Log*, the official publication of the Neptune Association.

The Navy is primarily interested in building up in the merchant service an organization which will be available, at short notice, to come to its aid in the defense of the country. To have such an organization, it is essential that the requisite ships be under the American flag. The Navy's paramount interest, therefore, extends to every legitimate means which will foster shipbuilding to the degree necessary to provide the needed merchant shipping. While the Navy is intensely interested in many other phases of the situation, all else must be secondary to the one great problem of national defense.

The seagoing American citizens of the merchant marine (both officers and men) are primarily interested in whatever will best promote their own welfare. With few exceptions they are intensely loyal to their country and would scorn anything which is derogatory to its interests. Almost unanimously they are loyal to their employers and would not look with favor on any move calculated to damage or discredit them. Nevertheless, even with all these most commendable traits and qualities, a different viewpoint often causes a totally different opinion of what should be done to achieve a desired end. Thus, differences arise which at times are so serious as to cause hotheaded men and women to shout "bad faith."

Reasonable dividends are the paramount issue with owners and operators. Of course, they are interested in the national defense, in the welfare of the personnel operating their ships, in the comfort and safety of passengers, and in the adequacy of their freight handling facilities. But if dividends fail year after year, the ships cease to operate, the lines cease to exist, and the owner either sells out or pockets his loss. In the end, merchant shipping must be profitable or nonexistent.

The limitations must be recognized. Merchant vessels are ordinarily private property. Their characteristics cannot be dictated, except in so far as the national government is willing to pay for certain features, such as speed or displacement, by either direct or indirect subsidy. They must go when and where remunerative business offers unless some paternal agency makes it worth while to do otherwise. No merchant ship is manned with even a fringe of superfluous personnel. It is logical to assume that every officer and man gives a full day's work to his employer every twenty-four hours. To require an individual to do additional duties may mean that the quality or the quantity of work done for his employer will suffer and profits may come down accordingly. If, then, an individual is to do something which will better fit him for the Navy's requirements, this "something" must be an act which will redound to the ultimate benefit of the operating corporation.

What does the Navy offer to the shipoperator to induce him to coöperate in the establishment of the Merchant Marine Naval Reserve on board his vessels?

The Merchant Marine Naval Reserve Flag. When the master and 50 per cent of the officers of a vessel are members of the Merchant Marine Naval Reserve and the vessel has been "designated by the Secretary of the Navy as suitable for service as a naval auxiliary in time of war,"[3] a warrant may be issued by the Navy Department authorizing her to display the Merchant Marine Naval Reserve flag. This symbol of direct approval by the Secretary of the Navy is certain to instill confidence in passengers and shippers and to give an added dignity to a vessel warranted to show it. It indicates to all who care to observe, that the officer personnel and the ship itself have been subjected to the searching investigations of the Navy and have been found worthy of a place in the scheme of national defense in time of emergency.

Stability of Personnel. The Navy looks forward to the time when certain financial remuneration may be paid to members of the Merchant Marine Naval Reserve serving on seagoing vessels under the American flag. Undoubtedly, regulations covering such payments will be so drawn as to require previous continuous service on the vessel to which attached before establishing eligibility for a place on the pay list. This requirement will tend to stabilize the personnel of ships on which the reserve is organized and, by reducing turnover, increase the efficiency of the whole organization.

Higher Standard of Personnel. As time goes on the Navy will increase gradually the requirements (educational, professional, and physical) for a commission in the Merchant Marine Naval Reserve. This gentle pressure will bring about a betterment in the mental and physical standards of officers and men on merchant vessels coöperating with the Navy.

Greater Operating Efficiency. The Navy hopes to organize and conduct voluntary courses in professional subjects of value to the merchant marine. These correspondence courses will be available to Naval Reserve personnel without cost. There is every reason to believe that a study of the courses provided (based on sound Navy experience

[3] Section 33, Act of February 28, 1925.

and practices) will be reflected ultimately in dividends due to more efficient operation.

Better Conduct. It is somewhat of an axiom that the more pride a man has in himself, the less liable he is to disgrace either himself or the uniform he wears. The conduct of seafaring men in the ports of the world is not beyond reproach at times. The Navy hopes and trusts that the confidence it manifests in a merchant officer when it commissions him in the Naval Reserve, will cause him to keep in mind the high standard of conduct expected and demanded of an officer of the Navy and will cause him to act accordingly.

Retention of Personnel. The operator has every reason to expect that if his ship is taken over for the use of the government, the personnel then on board will be retained on the vessel for the time being. This is a feature of tremendous importance to the owner or operator, for it permits him to keep his skilled personnel intact for a time; is an assurance that the vessel will not meet with damage or abuse due to being commissioned hurriedly with officers and men unfamiliar with her machinery or peculiarities; and holds out the hope that, unless hostilities are long drawn out, the vessel may be returned to her peaceful duties as a commerical carrier with the company's personnel almost undisturbed in their billets.

Less Probability of Loss. The chances of losing the ship during the first few weeks of hostilities will be lessened if all, or a great part, of the officers are members of and have been trained by the Naval Reserve. Such officers will have received preliminary instruction in the art of cruising in formation, in zigzagging, the handling of torpedo-defense guns, use of smoke boxes, signaling, and in other things kindred to the profession of a naval officer. Since proficiency in the means of defense is a great safeguard in modern warfare, the knowledge thus gained cannot but reduce the hazards to which the ship must be subjected.

Greater Security in Foreign Ports. The time may come when American vessels will be lying in foreign ports and the government under whose jurisdiction they are for the time being will be considering their seizure in the same way that the United States took possession of the Dutch vessels in our ports during the World War. In such an event, if the officers on board are members of the Naval Reserve, the United States may have the ships placed in commission as vessels of the Navy and thereby protect them from seizure and possible confiscation.

What does the Navy offer to the individual officer to induce him to enter the Merchant Marine Naval Reserve?

Assured Position in the Event of Mobilization. The acceptance of a commission in the Naval Reserve assures the recipient of the maintenance of a commissioned status during the commencement of hostilities and places him in line for promotion as the Navy expands. It removes him from all the uncertainties of draft laws, hasty recruiting, and hurriedly formed examining boards. It gives him an opportunity to become familiar with the customs of the service and thereby gives greater opportunity to obtain more important positions as hostilities continue.

Educational Opportunities. At the present time, the Bureau of Navigation is offering a course in navigation conducted in accordance with the generally accepted standards of correspondence schools. It is also prepared to furnish pamphlets covering many other courses for self-education in subjects of interest to the seagoing profession. The privilege of obtaining these courses without charge should be one of value, especially to the younger merchant marine officers, since a study of them is almost certain to bring advancement in their chosen profession. Training duty with the fleet, one of the opportunities which will undoubtedly come in the future, may be classed as almost important part of the whole educational program.

Personal Satisfaction. A member of the Merchant Marine Naval Reserve may feel that he is doing his duty toward the national defense in no less degree than his brothers-in-arms in the regular services. That knowledge, together with the satisfaction which must come to him through the possession of a commission from his government, will enhance his personal pride, improve his position in society, and will enable him to perform more efficiently the duties of his office. It will also serve to elevate his standing with the operating officials of his company, who, he may rest assured, are ever on the lookout for men of ambition and ability.

And what does the Navy expect to gain by enrolling officers of the merchant service in the Naval Reserve and admitting them to

that great brotherhood of combatant officers of the world's fighting fleets?

The Right to Their Services. First and foremost, it obtains the undisputed right to the services of such officers immediately upon a declaration of hostilities or national emergency, to be used in such manner and in such places as may be deemed for the best interest of the government. This is a right the Navy possesses only in a limited degree while the merchant officer is in civil status, since he is not subject to draft except for certain specific purposes.[4]

Adequate Safeguards to the Government Interests. The complicated process of commissioning these officers in the federal service is effected in time of peace, in an orderly and efficient manner; adequate records are prepared; thorough physical examinations are carried out; the character and ability of the applicant determined; and the interests of the government properly safeguarded. To those who have struggled with the glaring errors made in the appointment of officers during the stress of war, with records which one would compliment immensely by speaking of as *fragmentary*, this reason alone is sufficient to justify the establishment of a Merchant Marine Naval Reserve.

Knowledge of the Individual. As the years go by the Navy will receive reports concerning the ability and the integrity of the various officers appointed in the Merchant Marine Naval Reserve. These will become a valuable means for determining the character and capabilities of the individual concerned and will assist greatly in the Navy's efforts to utilize him to the best advantage if ever called to active service.

Education of the Individual. The gradual dissemination of information regarding naval customs and methods of conducting business will reduce somewhat the percentage of errors made in past emergencies. The study courses and training provided by the Navy will improve the professional ability of those taking advantage of them, and thus simplify the tasks of the commander in chief when he finds it expedient to place great responsibility on the shoulders of merchant officers.

"The mission of the Naval Reserve is to procure, organize, and train the officers and men necessary in the event of war for the expansion and operation of the United States Fleet and Naval Transportation Service."[5]

In view of this there can be no object in taking into the Naval Reserve individuals whose services would not be utilized by the Navy in the event of mobilization. Since the best interests of the United States would not be served by mobilizing all licensed officers of the merchant marine as a part of the Naval Reserve, and thus crippling the nation's water-borne commerce at a time when its continued operation would be most essential, the Merchant Marine Naval Reserve cannot be considered as a reservoir of trained personnel for general detail. The mission of the Merchant Marine Naval Reserve must, therefore, be considered as much more restricted than that of the reserve as a whole. It may be stated briefly as *the training of officers and men serving on seagoing vessels of United States registry for service on their own vessels when commissioned in the Navy in time of war.*

The basic act which authorized the creation of the Merchant Marine Naval Reserve provided that officers and men "shall be paid per annum, under such regulations as the Secretary of the Navy may prescribe, at the rate of not exceeding one month's base pay of their corresponding grades, ranks, or ratings in the regular Navy, which pay shall be additional to any pay to which they may be entitled for training duty: *Provided*, That funds equal to the amount required for the purpose of this section shall first have been made available by the Congress for this specific purpose."[6] While funds for the above purpose have been included in

[4] "No master, mate, pilot, or engineer of steam vessels licensed under title fifty-two (R.S. 4399-4500) of the Revised Statues shall be liable to draft in time of war, except for the performance of duties such as required by his license; and while performing such duties in the service of the United States every such master, mate, pilot, or engineer shall be entitled to the highest rate of wages paid in the merchant marine of the United States for similar services; and, if killed or wounded while performing such duties under the United States, they, or their heirs or their legal representatives, shall be entitled to all the privileges accorded to soldiers and sailors serving in the Army and Navy under the pension laws of the United States." (Act of 22 May, 1896, sec. 2).

[5] Article H-1101 Naval Reserve Regulations, 1925.

[6] Section 33, Act of February 28, 1925.

the annual budget estimates on two different occasions, the specific appropriations needed have not been made by Congress.

However, the Navy Department decided to proceed with the building up of this important class of the Naval Reserve on a strictly non-pay status. In setting about this task, it was realized that the value of the new branch of the reserve would have to be *sold* to both the operators and the ship's personnel, and that, without the allurement of pay of some kind, this might prove to be no easy task. It was, accordingly, determined to restrict our first efforts to the appointment of commissioned officers in the Naval Reserve, from the licensed personnel of seagoing merchant vessels under the American flag, of not less than 2,500 tons gross. In making such appointments, the Department wished to eliminate as far as possible all probability of personal favoritism, of company influence, or of political complexion. It was easy to see that any attempt to place each candidate in accordance with his individual qualifications would be a task requiring years of effort, endless investigations, and hopeless confusion. The fairest practicable method seemed to be to divide desirable merchant vessels into classes in accordance with their tonnage, characteristics, or probable use by the Navy, and then to assign a certain rank in the Merchant Marine Naval Reserve to each licensed position in each class. This policy was adopted, and it will remain the best until some equitable method of determining the relative merits of individual officers is developed. When one considers the difficulties of determining the relative merit of officers of the regular Navy, even with fitness reports covering 100 per cent of their time and with the large personal knowledge gained by years of association at sea and ashore, it should require no large imagination to foresee the pitfalls in the paths of well-meaning individuals who contend that every officer in the merchant service should be appointed in the rank for which he is best qualified.

While the position held on board his own vessel largely determined the rank assigned to a prospective officer, it had little to do with his precedence in grade, once he was appointed. When the first appointments were made, there were several hundred of the same grade issued as of the same date. The seniority of these officers among themselves, in any grade, was determined by a board of officers which considered all the data available in each case, giving due weight to previous naval service, age, length of seagoing experience, character of credentials submitted, size and type on which serving, and other matters of record. The investigation was thorough, and each individual may rest assured that his precedence was determined on an impartial basis.

The Merchant Marine Naval Reserve is in only the first phase of its existence and should ultimately become one of the bulwarks of the national defense. It has seemed wise to those engaged in the work of organization that the Navy move slowly; that it make certain of its ground before going too far in developing this part of the reserve. It is a new venture as far as the United States is concerned. A few missteps and misunderstandings might undo all the good work that has been accomplished so laboriously. It will require some few years of operation and administration before the Navy will understand so thoroughly the viewpoints of operators and merchant-ship personnel that it will be able to appraise them at their true value.

Naval officers as a whole will watch the progress of the Merchant Marine Naval Reserve with the greatest interest; will hope that those officers of the merchant service honored with a commission in the Naval Reserve meet every expectation of the Navy Department and of the American people; and will expect them to so shape their conduct in the ports of the world that they may enjoy, as a common heritage, the high regard in which the Navy's commissioned personnel is held among all nations.

The Merchant Marine Naval Reserve is an organization conceived and built up for the mutual benefit of the owners and operators of American vessels, the personnel of the seagoing merchant marine, and the government of the United States. It will be of value only in so far as it helps one or all of the interested parties.

The Navy and the merchant marine need each other to round out their spheres of usefulness to the nation. Each can and should understand the other's necessities, capabilities, and aspirations. In such a spirit of coöperation, the Merchant Marine Naval Reserve will move forward until it becomes a credit to the Navy and to itself.

The Origin *and* Early Development *of* Naval Medicine

By COMMANDER W. L. MANN *(M.C.), U. S. Navy*

THE first volume on the history of naval medicine has yet to be written. One writer states: "So little is known historically of the naval medical officer, yet what there is known is so interesting, that it is unfortunate that more of this information is not available." With the limited time and sources at my disposal, this article does not presume to cover comprehensively an unexplored field. Its purpose is to present some of the interesting side lights on the salient points of naval medicine's early development.

A cursory review of the origin and development of the profession of naval medicine shows that it evolved during the days of the Roman Empire, almost disappeared as a distinct entity during the Dark Ages, and later became an organized medical service in the Venetian navy during the fourteenth century. About this time, ship's barbers functioned as ship's surgeons, in addition to tonsorial activities. Not so very long ago, comparatively speaking, the regulations of one of the European naval medical schools required that assistant surgeons be able to "shave and bleed." In the seventeenth century the physicians on ships were rated as "common" men, "pressed" men, i.e., forcibly inducted in the service. In 1704 they became warrant officers; in 1808 senior surgeons attained wardroom rank; in 1843 they were elevated to commissioned officers, and in 1856 the junior surgeons were allowed wardroom rank. (British.) In more recent times, the naval medical corps has developed into a highly specialized organization that endeavors to apply the principles of modern medicine towards the advancement of the science of naval warfare.

Naval medicine today may be regarded as one of the components of modern medicine, and as such should be entitled to share in some of the latter's achievements, of which President Coolidge says "there is no finer page in the history of civilization than that which records the advance in medical science."

NAVAL MEDICINE OF THE ANCIENTS

Although naval warfare dates back to prehistoric times when, in hand-to-hand combat, man fought man in his dugout canoe, yet many centuries of civilization passed before history recorded any organized attempt to relieve the sick and wounded on board fighting craft. The fact that our prehistoric ancestors were familiar with some forms of maritime transportation is indicated by the discovery, in England, of dugouts of the Stone Age.

The Greek forces which encamped on the beach before Troy—in huts alongside their ships—were essentially a naval expedition, and their medical officers can be regarded as ancient naval surgeons.* When the truce was broken by Pandarus—the Trojan bowman who wounded Menelaus—a Greek commander, Agamemnon, the brother of Menelaus, sent for the fleet surgeon, Machaon, a famous Greek physician. His treatment of the case is described by Homer in the *Iliad,* Book IV, as:

> Without delay he drew
> The arrow from the fairly fitted belt.
> The barbs were bent in drawing. Then he loosed
> The embroidered belt, the quilted vest beneath,
> And plate—the armorer's work—and carefully
> O'erlooked the wound where fell the bitter shaft,
> Cleansed it from blood and sprinkled o'er it
> With skill the soothing balsam of yore which
> The friendly Chiron to his father gave.

Regarding ancient naval sanitation it may be mentioned that Homer alludes to the ex-

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cellently clean condition of the vessels, hence the word "shipshape" could be appropriately used in those days to denote a condition which implies the proper enforcement of sanitary measures.

It may be inferred that the ancient sailors were familiar with sulphur fumigation, as we read of Ulysses—who spent many years of his life at sea, where he became familiar with the sanitary measures in operation afloat—scraping the ground and burning sulphur over the place where he slayed the "wooers." "Woman, bring sulphur, a protection against harm, and bring me fire to fumigate." (XXII *Odyssey*.)

The first hint of any attempt to provide facilities for the care of wounded of fighting ships is contained in the name of a trireme with the Athenian fleet (431-401 B.C.). The Greeks are said to have applied appropriate proper names, which fact forms the basis for the assumption that the trireme *Therapeia* was probably the prototype of a hospital ship.

The first record of a distinct naval medical corps was during the days of the Roman Empire, which reached its highest development during the reign of Hadrian, A.D. 117 to 138. The allotment of naval medical officers was one to every two hundred men; each trireme carried a medical officer. The age limit for entry into the naval medical corps was twenty to twenty-one years. Medical service in the Roman navy was, perhaps, so unduly hazardous—or else for some other reason disliked—as to cause some difficulty in obtaining the required number of naval surgeons. Consequently, double pay and emoluments for medical officers were resorted to in order to induce doctors to enter the Roman naval service. On inscriptions relative to the Roman fleets which maintained headquarters at Ravenna and Micerium, the names of the ship's surgeons of such triremes as the *Cupid*, *Faith*, and *Tiger* are always followed by the word *duplicarius*, indicating his status of double-pay allowance. This word is never used in connection with any of the medical officers of the Roman army, of which we have inscriptions of some sixty.

The ship's surgeon of the three-banked ship *Cupid* was M. Satorius Longius.

We have authoritative records of the pay of the Roman naval surgeons. Their original pay amounted to 450 *denarii* a month, which was later increased to 600 *denarii*, and after the reign of Septimus Severus, their monthly pay checks were increased to 1,000 *denarii*.

For further information of the status of the ancient naval surgeon, we are forced to resort to the records of the Roman army surgeon, and apply these by inference. If such assumptions are correct, the medical corps of the Roman navy ranked with what corresponds to petty officers—*principales*—and formed a part of the highly elaborated bureaucracy accompanying military units, which included accountants, notaries, registrars, and civilian functionaries of all kinds. (Garrison.) They were classed as *immunes*—free of combatant duties.

The military surgeons of those days enjoyed certain privileges. They were exempt from performance of public works, and entitled to restitution for any material damage or fraud perpetrated against them while absent on duty (so-called *jus restitutionis*).

Their surgical kit contained metal knives, scalpels, hooks, sounds, and forceps; their medical supplies consisted of boxes of ointments and surgical dressings.

Specialization by ancient naval medical officers is recorded by Galen, who mentions that an eye specialist accompanied the naval expedition to Britain. These eye specialists did not occupy a very high social position —the majority being quacks. The eye disease known as trachoma is said to have been prevalent in the Roman military forces.

Since Rome established well-equipped hospitals for the sick and wounded of her land forces, it would not be unreasonable to assume that the Roman trireme *Aesculapius* attached to the Micenum fleet, if not a hospital ship in the modern sense, was at least a vessel intended for the accommodation of the sick and disabled of the fleet.

Naval Medicine in the Middle Ages

With the decline of the Roman Empire, the naval medical organization, as an entity, practically ceased to exist during the Middle Ages, although there are records to show that even in the Dark Ages, the military value of medical protection on fighting craft was recognized. That vessels of that period carried an attendant to take care of the sick is proved by chapter 264 of the Nautical Laws of the Dark Ages *(Consolato del Mare)*, which mentions "metge," said to be

a Catalan corruption of *medicus*. In this connection, the word "medico," defined by a writer of several generations ago as a "familiar appellation for the ship's surgeon," is derived from the Latin word *medicus*, or doctor. (This is contrary to the impression that some of us may have, that the word was of Spanish origin from our association with the Spanish during the war with that country.)

As early as the eleventh century, vessels carried barbers and barber's assistants—*barbiero* and *barbierato*—who practiced a rude form of surgery. One of the poets writing about 1289 on the "Dangers of the Sea and How to Avoid Them," cautions seafarers against embarking without "priest, barber, and a doctor" with "all things needful" for the latter.

From the twelfth to the fourteenth century, the galleys of the Republic of Venice carried physicians and surgeons, and through the fourteenth century this republic maintained an organized naval medical service.

There are numerous records to show that these naval surgeons of the Middle Ages—as today—served not only aboard ship but on stations beyond the seas.

We read of one naval surgeon, Gualterius, who about 1320 had a remarkable career. Such confidence was reposed in him that, besides his annual salary, he was given an allowance for quarters, supplied with professional necessities, helped to pay his debts, granted a considerable sum of money as a dowry in order to marry off one of his nieces, and on one occasion—naval paymasters note—*was permitted to draw three years' pay in advance.* (Corsini.)

One of the physicians to the household of King Edward III, about 1330, was Master Pancius de Controne, evidently of Italian lineage, who was described as "Docteure of Physique and Maister Surgeon and Potycary." Among some of the instructions as given in *Liber Niger* we find that the military surgeon, even in those days, supervised the dietary, as shown by the following: "Docteure of Physyque standith muche in the King's presence at his meles, councellying or awnsiering to the Kings' grace which dyet is best accordingly."

The battle of Lepanto, October 7, 1571, the last great fight between the Christians and the Turks, marks the disappearance of the galley, and the emergence of the physician as a recognized part of the seagoing personnel. An interesting description of this battle is given by Cervantes, who had his left arm shattered in the fray, and describes the attending naval surgeons. (Stitt.)

Naval Hygiene and Sanitation

The military value of sanitary measures was recognized from the days of the great conqueror Cyrus, whose father Cambyses, according to Xenophon, taught him that the prevention of diseases in camp was one of the most honorable functions of a general, while the office of treating diseases stood, relatively to it, as the office of repairing cast-off garments of the army.

Xenophon led successfully 10,000 Greeks through a cold and most inhospitable country by attention to the health of his soldiers.

Doctor Rush maintained that camp disease is not necessarily connected with the soldier's life, and cites as evidence to support this contention that the armies of ancient Greece and Rome were not only healthy, but had no diseases peculiar to military life.

One of the first recorded regulations on the proper disposal of human waste products in the field is given in Deuteronomy xxiii, twelfth and thirteenth verses.

The Roman soldiers, and undoubtedly the sea forces also, were required to pay strict attention to personal hygiene. The use of spirituous liquors was forbidden; a daily bath in cold water was required, and a woolen shirt was worn next to the body. As we know today, wool is about the only fabric which, when saturated with perspiration, still permits the passage of air through its substance, and thus insures proper ventilation of the human body.

Naval leaders have long realized the value of hygiene and sanitation, but often too much attention to health may prove undesirable. The surgeon of the *Monarque* relates how the admiral, being prejudiced in favor of James powders, insisted on ordering this remedy to be prescribed for all cases of fever, with a result that four to five died daily from this potent drug.

The early British Navy's commanding officers were required to give attention to

naval sanitation, as shown by "The Instructions Issued by the Royal Navy," in 1596, which states: "You shall give orders that your ship may be kept clean daily and sometimes washed; what with God's favor, shall preserve from sickness and avoid many inconveniences."

Lime, ferrous sulphate, carbolic acid, vinegar, and sea water were in constant use on wooden ships as disinfectants.

Nelson is said to have appreciated the military importance of naval sanitation; writing from the Mediterranean in October, 1803, he states: "The great thing in all military service is health." At that time the health of his fleet was excellent. The *Victory* at one time with 840 men on board, had but one sick in bed, although twenty months at sea. Nelson was aboard this vessel nearly twenty-four months without going ashore, July, 1803, to July, 1805, at Trafalgar. To maintain his personal health, Nelson walked six to seven hours daily on deck, apparently appreciating the healthful benefits of fresh air and sunshine. (As we know today, the actinic rays of sunlight are also a preventive for certain food-deficiency diseases.)

Food

Keeping in mind our recent knowledge of the value of vitamins in the diet, it is most interesting to review the history of naval rations. As is quite well known today, vitamins are essential to health and the absence of such substances in the diet was the cause of such food-deficiency diseases as scurvy, beriberi, etc., which were so prevalent in the fleets of bygone days, when their rations were low in fresh provisions.

In the days of the sailing ships, the tactical radii of fleets were limited almost entirely by the health of the crews, which, in turn, were dependent upon the extent of the prevalence of disease due to an imbalanced diet.

Whether or not the ancient Phoenicians knew the value of fresh provisions (vitamins) for the maintenance of health aboard ship, it is impossible to state, but we do know that they did not make long uninterrupted voyages, but frequently disembarked, remaining long enough en route to repair ship and to plant and harvest crops of fresh food stuffs. In their voyage around Africa and return, they resorted to this practice, which enabled them to feed the required amount of vitamins and thus successfully accomplish long cruises.

One ancient writer refers to *panis nauticus* (sea bread), used in the Roman navy. It is not improbable that this was of a high vitamin content and used to prevent dietetic diseases aboard, as we have records that the military leaders ashore substituted whole wheat for flour in the daily ration of soldiers. Caesar, in his expedition into Gaul, fed wheat to his troops. (In view of the researches of modern medicine, the vitamins of wheat are in the chaff, which is apt to be lost in making flour; hence the Romans were probably aware that whole wheat was more wholesome than flour.)

Scurvy was once a dreaded disease on ships. When Lord Anson made his voyage around the world, four out of every five men in his squadron died of scurvy. The British Channel fleet, in a voyage of ten weeks, had 2,400 cases of this malady.

When the Spanish and French fleets arrived at the West Indies, they landed one thousand sick on arrival, and during their forty-day stay, buried over one thousand others. One of the last expeditions of the British Navy where scurvy occurred was in 1824, when the *Larne* lost one-half her crew, and the *Sophie*, one quarter.

The death rate in the early American Navy was also high. On the frigate *Macedonian*, from April 2 to September 5, 1827, 101 men out of 376 died, including Doctor Cadle, the ship's surgeon.

Scurvy can be prevented by the use of Vitamin C, which is present in fruit juices and green vegetables. The Dutch, in 1564, and Sir R. Hawkins in 1593, used lime juice to prevent scurvy. It was about 150 years later that the eminent naval surgeon Lind recommended the compulsory use of lime juice in the British Navy. It then required forty-one years more for the Admiralty to place in effect this recommendation, and to eradicate scurvy. Herbert Spencer cites this delay as an apt illustration of the "inertia and torpor of administrative bodies."

As early as 1696, fresh vegetables (called "green trade") were cited by a naval surgeon as a cure for dietetic diseases on board ship. Grains and other seeds when germinating are rich in vitamins; one naval surgeon in 1807 noted the fact that "green peas soaked in water and allowed to vegetate"

were useful in scurvy—a remarkable observation.

The naval hospital corpsman in early days was called the "loblolly" boy, from his connection in feeding a form of gruel of that name, made from maize, to patients suffering from dietetic diseases. In the *Colloquia Maritima*, published in 1688, a dietary of "husked hominy and loblolly" was recommended as a cure for "calentures, scarbotis (scurvy), and the like contagious diseases." Note the term "contagious."

WATER

Ancient sailors are said to have obtained drinking water from sea water, by boiling the latter in large pots covered with sponges, which were wrung out when saturated. This method required about six repetitions before suitable drinking water was obtained.

The Roman forces carried their canteens filled with vinegar, which was diluted with water and drunk, thus partially sterilizing their drinking water. Doctor Benjamin Rush, writing before the discovery of bacteria, explains the action of vinegar as "effectually resisting that tendency to putrefaction to which heat and labor dispose the fluids."

Among the drugs used to purify water were included alum, bitter infusions, and alcohol (Simons). In 1827, the surgeon of the *Altholl* recommended the use of lime as a general purifier of water and precipitant of organic matter.

There are obscure paragraphs of ancient writers implying that the water aboard ship was carried in charred containers. The charring of water containers was rediscovered in later days in England, and this procedure was of much benefit to Cook in his long voyages.

In this connection it may be noted that Surgeon Anderson, one of Captain Cook's surgeons, died of tuberculosis at sea on the same day land was sighted, and that great commander "to perpetuate the memory of the deceased, for whom he had particular esteem, distinguished it by the name of Anderson's Island."

As is well known today, malaria is transmitted by the species of mosquito which lives in the vicinity of fresh water. In 1803—before this fact was anticipated—Nelson ordered the compulsory use of quinine by all seamen of the Mediterranean fleet, on duty "wooding or watering" their vessels, i.e., in proximity to fresh-water breeding places of the malarial mosquito.

The following figures for the British Navy indicate the progress made by early naval sanitation in reducing the death rate of sailors:

1779—1 in 8 died annually.
1811—1 in 32 died annually.
1836—1 in 72 died annually.

THE COCKPIT—THE BATTLE DRESSING STATION

In Falconer's *Marine Dictionary*, 1771, the cockpit is defined as the "apartments of the surgeon and his mates, being the place where the wounded are dressed in time of battle."

This space was situated on the orlop deck, below the water line of the ship, just above the hold—a dark, noisome apartment filled with foul odors. Above the cockpit was the gun deck, a place of noise, carnage, and excitement in action, from whose leaky seams dripped the blood and water of battle on the operators below.

In the cockpit lived the senior midshipmen, the surgeon's mates, the master's mates, and the civilians—clerks to the captain and purser. The berths of the midshipmen were converted into receptacles for the wounded by placing a sail over them, and the mess table in the center became the operating table for the ship's surgeon.

Smollett, who served in the navy as a surgeon's mate before taking up literature, gives us a vivid description of an action in those days which, allowing for the natural exaggeration of literary genius, may be considered as a faithful picture of surgeons of those ships and of their professional abilities.

> The head surgeon arose from the deck where he had been engaged in making his peace with God, strengthened his resolution with a huge drink of rum, which he insisted on sharing with his civilian assistants, the chaplain and the purser, and then went to work hewing off arms and legs without sense or mercy. The fires of delirium arising from the fumes of the rum maddened the chaplain, who stripped himself of his few garments, smeared his body with blood, and was withheld from running on deck only by the well-placed blow of a seaman whose left hand had just been shot away.
>
> The purser sat on the deck with his head in his hands cursing the hour he deserted his peaceful profession of a brewer to engage in this life of terror and disquiet. He too, becoming violent

from liquor, was locked in the adjacent stateroom of the surgeon's mate, where his howls added to the horror of the din overhead.

While we worked at our task with shirt sleeves tucked up to our armpits and hands dyed with blood, the gun deck above an inferno of smoke, noise, and slaughter, wounded men dropping with dull thuds on the benches prepared for them and shreiking, moaning, or whining for assistance, a shot entered the cockpit and crashed into the purser's storeroom, making such a wreckage and state of terror the surgeon again abandoned his ruthless mutilation and dropped to his knees in prayer.

According to Taylor:

The horrors of this place were so well known that men almost preferred death to wounds requiring operation. Here the surgeon set out his long amputating knives, bandages and spirits. The rule on English ships was to take the wounded in the order in which they came regardless of the nature or the severity of the case. This was a democratic rule and inspired the men with a certain confidence, knowing that they would be treated without regard to rank or precedence, fortune or favor, but it had serious disadvantages. The man or officer who needed to have an artery tied might bleed to death while the shipmate ahead of him in line was being treated for a less urgent condition. The circumstances did not favor elaborate surgery. The mangling, tearing, and bruising of the flesh produced by flying splinters made infection a certainty. Facilities for skillful nursing were lacking. Hence the rule for most injured limbs was to amputate. If a hasty examination suggested that a wounded man was too far gone to survive, he was carried on deck and thrown overboard. Otherwise, he was anesthetized as far as possible by opium and liquor, given a piece of leather to chew on, and put on the table. A few swift passes were made with the gleaming knives, the spurting vessels were deftly tied, bandages were hurriedly applied, and the job was done. British surgeons were in the habit of scalding their amputation knives (and our Colonial medical officers imitated them in this) supposing that a hot knife was less painful than a cold one. This must have been beneficial as an aseptic measure. The patient was laid to one side and the next unfortunate took his place on the table.

Not every wounded man got below to the surgeon. If his condition was so desperate as to preclude a hope of recovery, he stood a good chance of being thrown overboard, and perhaps this seemingly cruel measure was the kindest thing after all. In the French and Spanish navies, a great point was made of carrying home the bodies of the dead, but during an engagement the British flung the dead into the sea without ceremony, considering that their first duty was to fight the ship and to win at all costs.

The cockpit, until the later part of the nineteenth century, remained the scene of medical activity during battle, when the change from sail to steam required this compartment to be utilized for machinery spaces.

The battle dressing station was then removed from the sheltered protection below the water line to an upper deck, usually the wardroom, thus exposing the medical personnel and the wounded to the gunfire of the enemy. In the naval battle of October 8, 1879, the wounded of the Peruvian man-of-war *Huascar* were collected in the wardroom, where many were subsequently killed by a broadside salvo from the Chilean ship *Blanco*. The wounded were then removed from this exposed location to a protected position in the storerooms and spaces adjacent to the coal bunkers.

In naval medicine, as well as other branches of the naval service, it generally requires a repetition of a military disaster before suitable measures are adopted to minimize the danger of its recurrence. This is shown by the battle of theYalu September 16, 1894, where the medical departments were still using wardrooms as battle dressing stations. In this battle a 30.5 centimeter shell dropped in the wardroom of the *Hiyei*, causing forty casualties, and killing or wounding all the medical personnel. A detail of able seamen was placed in charge of the wounded. Due to the exposed location of the medical station on another ship of this fleet, the medical equipment and supplies were destroyed, necessitating improvised dressings and use of engine oil in the treatment of burns.

Fortunately, the navies of the world have now gone back to the days of the cockpits, and again have placed the sheltered stations for assembly of the wounded below the water line of the ship.

The following is a sketch of conditions on the *Suvaroff* after the battle of Tsushima.

A visit to the messdeck revealed a scene of horror. The wounded were gathered in windrows, their terrible condition mercifully concealed by complete darkness and the fumes of suffocating smoke. To our calls there was no answer. The silence of the grave reigned in that smoky darkness.

It is very probable that all who were in the closed compartments under the armored deck, where the ventilators took in smoke instead of air, gradually became suffocated, lost consciousness and perished quietly and painlessly. The engines had ceased to work, the dynamos were silent, and the ship rolled like a derelict as, in the vortex of the battling ships, we waited for the torpedo which finally sent the good ship to

the bottom. The first shell from the enemy exploded in the temporary dressing station established between the turrets midships, killing everyone in the vicinity, but mercifully spared the junior doctor who was dressing a badly injured man at the time.

Apparently, there is very little improvement in the conditions existing in the battle dressing stations during modern naval engagements, as indicated by the following description of the activities of Senior Surgeon Amelung aboard the *Seydlitz* during the battle of Jutland.

The first enemy shot to strike the ship explodes in casemate No. 6 and destroys the forward dressing station. The water-tight doors open for an instant, and the third medical officer, the barber, and the chaplain, who has his head bandaged, take refuge in the principal station. The remainder of the personnel of the forward station are dead.

The wounded flow in. It is not possible to examine them carefully one by one. And while Amelung is quickly applying first-aid treatment he sees a flash and the room is filled with a dense cloud of smoke and gas produced by the explosion of an enemy projectile in the rooms above. Everyone puts on his mask. The heat is suffocating and prevents all work. Amelung therefore tears off his mask, finds that he can breathe, and goes on with his treatments. Meanwhile, a fire having broken out in turret C for the 280-mm. guns, compartment No. 3 becomes a lake. The wounded are then deposited in the auxiliary station, where the two subaltern surgeons take turns while one assists Amelung, who has not left the operating table.

There is but little ventilation. The temperature is above 40° C. (104° F.), during the entire progress of the battle. The supply of fresh water is interrupted. That on hand in the sick bay is distributed to the wounded who are parched with thirst and to the firemen who come asking for a drink. The surgeons wash their hands in contaminated water but dry them on sterilized fabric, of which, fortunately, there is an abundant supply.

Coal dust settles on everything. Splotches of blood are seen everywhere. Every little while the fire hose is passed through the dressing station and soils everything. Each pause in the battle is taken advantage of to clean things up a little and change the blood-soaked dressings. It is impossible to perform any major operations. There is no time. It would be too complicated to administer anesthetics. Asepsis is a myth; infection will therefore be certain. The rolling of the ship, which even causes the wounded to fall from the table, makes it impossible to guide the instruments with precision, and the vibrations extinguish the electric lights at every instant, so that recourse is had to candles. By midnight the electric mains are entirely demolished. Extensive use is made of morphine. Fractured limbs are vigorously pulled into position and splints quickly applied. Serious hemorrhages are checked by a pressure dressing and sometimes by the temporary application of a tourniquet, direct scientific ligation being out of the question.

. . . . . .

The situation of these suffering men is terrible, crowded into a small space without light or air, buried alive in an oven, and not knowing what is taking place above them. When the ship inclines to one side they perceive it but do not know whether she is changing her course or is about to sink. (*Annali di Medicina Navale e Coloniale.*)

SICK BAY

The term "sick bay" derives its origin, not, as commonly assumed, because it was a compartment assigned to accommodate the sick members of the crew, but from the fact that in early days it was such a loathsome place that it actually made men sick. (Shippen.)

The present location of the sick bay—well forward in vessels—seems to be a traditional arrangement, derived from the galley period, through the French, thence to us through the English, who had acquired many of their ideals of naval architecture from captured French warships.

The forward location of the sick bay originated in the crude galley days when the sick were regarded as useless encumbrances, and the state of medical knowledge did not permit the ready diagnosis of the infectious from non-infectious diseases. The after portion of the ship was occupied by cabins: consequently, in order to secure a wide separation of the sick from the sound members of the crew, those unfortunately ill were taken to the compartment in the bows beneath the water line. This compartment, close, dark, and dismal, under the lower deck of the galley's prow, served the combined purpose of stowing the cables and the medicine chest. Here upon the cables were piled the sick and wounded. "So great was the ensuing mortality that the wounded died like flies."

In the fighting galleys of the French this compartment was appropriately designated *tollar*, for *tolerare*—to suffer.

The early British vessels were not constructed with a specially designed compartment for the care of the sick. Henry Teonge, a chaplain of the British Navy (1675-1679), has left us detailed descriptions of life aboard ship, yet fails to mention a sick bay.

However, the British regulations at a later period (1757) state that the captain

shall set aside a convenient place for the reception of the sick, "whither they are to be removed with their hammacoes and bedding when the surgeon shall advise the same."

One of the medical writers of the middle of the eighteenth century regards the sick bay as three degrees more offensive and suffocating than the cockpit and leaves us the following pen picture of a sick bay of that period.

> But when I followed him with the medicines into the sick berth or hospital, and observed the situations of the patients, I was much less surprised that people should die on board than that any sick person should recover. Here I saw about fifty miserable distempered wretches, suspended in rows, so huddled one upon another, that not more than fourteen inches space was alloted for each with his bed and bedding; and deprived of the light of the day, as well as of fresh air; breathing nothing but a noisome atmosphere of the morbid steams exhaling from their own excrements and diseased bodies, devoured with vermin hatched in the filth that surrounded them, and destitute of every convenience necessary for people in that helpless condition.

It appears that the first specially constructed sick bay, designed by Captain Markham on the *Centaur*, was due to the urgent recommendations of Trotter (1804), an eminent surgeon of the British Navy.

As early as 1810 the French removed the location of their sick bay from the lower to upper decks, and the British Navy some years later. On the other hand, the American Navy as late as 1880 was using—except on receiving ships—the berth deck for the sick-bay spaces, thus causing vigorous, urgent protests from our medical officers.

Origin of Naval Medicine in America

One of the first allusions to naval medicine in America was made by the "first admiral of New England," also governor of Virginia, Captain John Smith, in the *Seaman's Grammar*, 1652, which outlines the post-combat plans aboard ship as follows:

> *Chirurgion*, looke to the wounded; and winde up the slaine, with each a bullet or weight at their heads and feet to make them sinke; and give them three gunnes for their funeral. *Swabber*, make cleane the ship. *Purser*, record their names. *Gunners*, sponge your ordnance. *Soldiers*, scoure your pieces. *Carpenters*, about your leakes. *Boatswaine* and the rest, repaire sails and shrouds; and, *cooke*, see you observe the morning watch. *Boy*, fetch my cellar of bottels. *Master*, lay him aboard, loufe for loufe. *Midshipmen*, see the tops and yards well manned with stones, fire pots, and brass bales.

The American Navy, with its medical corps, is said to have had its embryonic origin in the colony of Virginia, being first developed there as a distinct arm of national defense, which was sanctioned by the royal authority of Great Britain.

Later, the colonists of Virginia, foreseeing the coming struggle with the mother country, in May, 1776, proceeded to form plans for creating a naval force by arming seventy vessels of the merchant marine, which were constructed at the Chickahominy Navy Yard, near Norfolk, Virginia.

In October, 1775, the Continental Congress ordered the first naval armament, and by the end of the year thirteen vessels of war had been authorized. On November 28, 1775, the Rules and Regulations for the Navy were enacted, and these, with certain modifications approved in 1780, form the basis of the present "Articles."

It appears that the Continental medical officers were familiar with a type of chemical warfare as a naval weapon. The brig *Defiance* was equipped with twenty earthen jars, filled with a mixture of decayed fish, asafetida, saltpeter, and brimstone, prepared with a wick, called an oxtail. When lighted, the gas-producing apparatus gave off nauseating and suffocating fumes—presumably non-lethal, yet effective in overcoming the enemy.

While on the subject of the early use of chemicals in naval warfare, it may be mentioned that the Confederates in the American Civil War planned to capture the *Monitor* by throwing balls of stinking combustibles below decks and compelling the crew to abandon ship. Needless to state, these plans failed to materialize.

Sick call in the early American Navy was announced by the loblolly boy going fore and aft on gun and berth deck, ringing a bell, "to give notice to those who are slightly indisposed, to venereal patients, and those with ulcers, to attend surgeon at mainmast, where he should have his table and prescription book."

It might be added that flogging was abolished in the United States Navy in 1850, and the grog ration eliminated in 1862.

Naval Hospitals

No definite records are available to show the existence of naval hospitals during the days of the ancients; however, there is rea-

son to believe that the "sick and wounded of the navy were received in the institutions erected by the government for them, before the time of Hadrian." (Gatewood)

One of the first prototypes of the modern naval hospital was established under authority of a decree, dated February 9, 1318, for aged and indigent sailors. This institution was founded by the naval surgeon Gualterius, and was under the direct supervision of the Doge of Venice. In connection with this institution, a herb garden was maintained for the cultivation of medicinal plants.

To France belongs the credit for the establishment of the first strictly hospital accommodation for naval use. When Colbert, minister of Louis XIV, organized the navy of France, and founded Rochefort, a naval hospital was erected about 1666 in the priory of Saint-Eloy.

England, a few years later (1695), converted the partially erected palace of Charles II at Greenwich into a home for aged and wounded seamen. It was not until 1756 that the first naval hospital was constructed along more modern ideas, when a London architect designed a naval hospital that was built at Stonehouse, near Plymouth, England. Since that time naval hospitals have sprung up along the coasts of all civilized countries—"Born of no religion, the offspring of sheer necessity, they await the tocsin of war."

Although the history of the Navy of the United States began as early as October 13, 1775, no attempt was made to establish naval hospitals until Congress passed the law of February 26, 1811, establishing these institutions. Shortly after the Revolutionary War there was no need for naval hospital facilities, as the American Navy practically ceased to exist when the last naval vessel, the *Alliance*, was sold in 1785. By July 16, 1798, Congress, realizing the need of institutions for the care of sick and injured seamen of merchant vessels, passed an act which was the beginning of the Marine Hospital Service. One year later this act was amended to include seamen of the naval service, who were cared for in the same hospitals with merchant seamen. As was to be expected, the scheme of divided control of naval patients did not work well.

On February 22, 1810, Secretary of the Navy Paul Hamilton, in a letter to the chairman of the House Naval Committee, prompted the Act of February 26, 1811, establishing naval hospitals, and placing the construction of them under the supervision of a board of commissioners.

Unfortunately, nothing much was done by the board of commissioners (consisting of the Secretaries of the Navy, Treasury, and War Department) from 1811 to 1830 toward erecting permanent naval hospitals, thereby forcing the naval medical department to utilize temporary buildings. Thus in Philadelphia in 1813 a "wretched hovel," calculated to hold eight patients but actually caring for, at one time, twenty-four patients, was used as a hospital.

In the "Regulations and Instructions Relating to His Majesty's Service at Sea," London, 1772, we find such abbreviations provided for use in the medical journal as D, DD, etc., for "discharge to duty," "died," etc., which abbreviations are still used in our Navy today. This fact is cited as one of the illustrations of the tendency of naval customs to persist.

Naval hospitals about this time were often used as take-offs for deserters, hence patients were sent to hospital "under charge of a discreete officer, accompanied by a surgeon or one of his mates." In 1795, an iron railing was placed around one of the British naval hospitals, the windows barred and doors locked at night to prevent desertions.

Our early naval hospitals were not far behind as places for desertions. The naval hospital at Philadelphia, about 1820, was described by one writer as a "hovel," where "patients remained until they could gather strength to desert."

The Secretary of the Navy in a letter to the House Naval Committee states that on "an average three out of five desert as soon as they get into a convalescent state." About this time the institutions of the Marine Hospital Service, now the Public Health Service, were used by the Navy for hospital accommodations.

Our latest medical regulations (1927), still require a medical officer to accompany patients to a hospital, modified, however, "when practicable," and "in serious cases" —a vestigal remnant of days of forcible recruiting and another striking illustration of how traditions "die hard" in the naval service.

Hospital Ships

Allusions have been made elsewhere in this article to the probable employment of naval hospital ships during the ancient and medieval eras.

It would appear that Spain was the first of modern nations to foresee and utilize the tactical advantages of hospital ships with a naval fleet. In the Armada there were, according to the Spanish account of it (Archdeacon's translation, 1588), "eighty-five physicians and surgeons for the hospital ships." (Quoted from Smart.)

It was some years after the famous voyage of the Armada that a disastrous experience of England caused this nation to realize the military value of hospital ships. In 1626, after the British expedition had reembarked from the landing at Cadiz, the fleet then cruised off St. Vincent, endeavoring to intercept treasure ships. "Where, having waited some time, the men began to grow very sickly; when, to compleat the miscarriage of the expedition, the sick men were distributed through the whole fleet, two to each ship, by which means the sickness was increased to such a degree that there were scarce hands enough to carry the fleet home." (Burchett)

Two years later, 1628, a select committee on the state of the navy reported to Parliament that there was "not good provision for seamen, that they were ill clothed, causing infection of ships."

In speaking of the British expedition to Santo Domingo in 1665, Dr. John Campbell in his *Naval History*, volume 2, page 101, mentions a hospital ship: "Before the forces were embarked, Adjutant General Jackson was tried at a court-martial, and not only sentenced to be cashiered and his sword broken over his head, *but to do duty of a swabber*, in keeping clean the hospital ship —a punishment suitable to his notorious cowardice."

The French also at an early date utilized seagoing ships to accompany a naval fleet in action for hospital purposes. Toward the end of the seventeenth century it was recommended that 100-bed hospital ships, devoted exclusively to the care of the sick and disabled, be attached to the French fleet in the proportion of one hospital ship to every ten ships of the line. These hospital vessels were to be constructed with high decks and large portholes and were to carry no batteries in order to provide more space for the wounded.

Several of the hospital ships accompanied the fleet which left the roadstead of Brest in June, 1690, to engage in the battle of Beachy Head. The hospital ships took positions with the cargo vessels on the right wing of the fleet—a tactical disposition which would, perhaps, be applicable today.

At one time hospital ships were usually the captured vessels of the enemy, rather unserviceable for other purposes, and often served chiefly as places of isolation for contagious diseases—such as the yellow fever cases in the West Indies—and for the purpose of detention.

The ships used to bring home the wounded of an amphibious expedition were transport vessels which had carried the troops to the scene of battle, and the mere presence of the sick aboard was the principal reason for designating them as hospital ships. "Corpses marked their course."

Sir Gilbert Blane records that Admiral Vernon—for whom Mount Vernon, the famous estate of George Washington on the Potomac was named—had two hospital ships available for his force in 1740-41. About this time Blane recommended the use of hospital ships to relieve the large percentage of sick in the West Indies.

Smollett, in chapter 33 of *Roderick Random*, says that the force of 8,000 able men landed on the beach near Boca Chica (about 1741) was reduced to 1,500 men.

> The sick and wounded were squeezed into certain vessels, which thence obtained the name of hospital ships, though methinks they scarce deserve such a creditable title, seeing few of them could boast of their surgeon, nurse, or cook; and the space between decks was so confined that the miserable patients had not room to sit upright in their beds. Their wounds and stumps being neglected, contracted filth and putrefaction, and millions of maggots were hatched amidst the corruption of their sores. This inhuman disregard was imputed to the scarcity of surgeons, though it is well known that every great ship in the fleet could have spared one at least for this duty; an expedition which would have been more than sufficient to remove this shocking inconvenience.

A red, white, and blue pennant flown at the mizzen topmast head was the signal used in 1796 to denote that the sick could be transferred to "an hospital ship."

During the period following the Napoleonic wars to the beginning of the Crimean campaign, there is little evidence to show

the employment of hospital ships (Sutton), and the real history of the modern hospital ship begins about the middle of the nineteenth century (Zur Verth). During the Crimean War in 1854 England employed a fleet of transports to convey home the sick and wounded. In twenty-two months over 100,000 patients were transferred home (Holcomb).

The British equipped two ironclad steamships—the first of this type of vessel to serve as hospital ships—for use in the China operation of 1858. Shortly after this, several ships were used in the American Civil War as hospital ships.

Bell states that the French are said to have built the *Annamite* as a hospital ship in 1877, and others of the class later, and if so, that nation can claim credit for the first vessel designed and constructed for hospital purposes.

The Italians possessed the hospital ship *Washington* in 1866, but it appears that no hospital vessel was present at the Battle of Lissa, on June 27, 1866, where the Italians lost six hundred men from drowning and only fifteen from gunfire. This battle occurred before the days of the application of The Hague Convention to maritime warfare, and this hospital ship was armed. The *Washington* was commanded by Medical Inspector Giovanitti, of the Italian Navy.

A rather careful search of naval records has failed to disclose the existence of hospital ships in the United States Navy prior to the outbreak of the Civil War. Emmons, in his list of American naval vessels, 1775 to 1853, does not mention a hospital ship.

However, the American naval authorities over one hundred years ago recognized the importance of hospital ships, and their use was contemplated, as indicated by the fact that the official instructions of this period specifically defined some of the functions of such ships and prescribed that the assigned position in the fleet should be maintained. Some eight years before the promulgation of these instructions, Edward Cutbush, of the American Navy, in his "Observations on the Means of Preserving the Health of Soldiers and Sailors," Philadelphia, 1808, speaks of a hospital vessel. He says that a hospital ship should be "large, dry, and commodious," fitted up for the express purpose with cradles, bunks, or cots, and should be supplied with bathing tubs. Cutbush proposed hospitals ashore "because there generally will be a sufficient supply for the hospital ship, after the squadron leaves the port."

The following was abstracted from "Rules and Regulations and Instructions for the Naval Service of the United States, 1818":

> The surgeon of the fleet is to be on board the hospital ship if there be one in the squadron; if there be not, he is to be on board such ship, or at such place on shore, as the commander in chief shall direct.
>
> The captain of an hospital ship is to be particularly attentive to see that the ship is kept perfectly clean, especially that part which is appropriated to the sick. He is to give strict orders that the buckets used by the sick are frequently emptied and washed, and that the dressings of wounds or sores be thrown overboard as soon as they are taken off.

Extensive use was made of hospital ships by the Federal forces operating on the Mississippi River during the American Civil War, and the official records speak very highly of the character of services rendered.

Isolation ships, in the form of river barges for smallpox patients, were in use at this time to serve the forces operating on the Mississippi River.

So far as could be ascertained the Confederate Navy employed no hospital vessel, although the regulations of the navy of the Confederate States, page 126, allude to a hospital ship. It is interesting to note, *en passant*, that General T. T. ("Stonewall") Jackson, of the Confederate army, was one of the first commanders to recognize the immunity of a medical department, and his attitude on this matter was said to be largely instrumental in stimulating the Geneva Convention which met a few years later and gave official international sanction to this principle. General Robert E. Lee adopted this principle about ten days later.

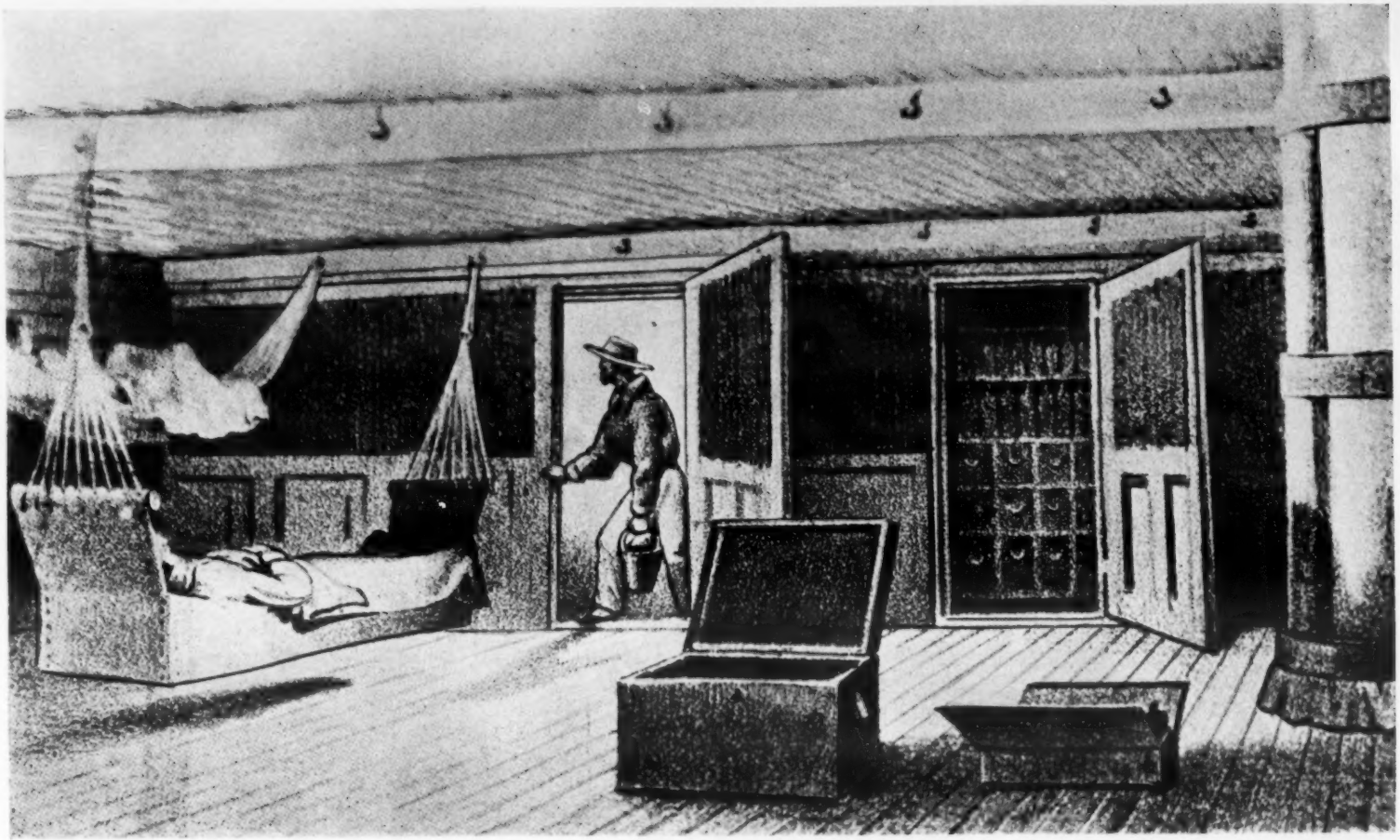
The American forces employed the following hospital vessels in the Spanish-American War: *Vigilancia, Relief, Missouri, Bay State, Olivette,* and *Solace.*

In the World War vessels of the United States Navy devoted primarily to medical purposes totaled 48,375 tons displacement.

Courtesy Commander W. L. Mann (MC), U. S. Navy

MEDICAL STAFF OF THE HOSPITAL SHIP *RED ROVER*

Photograph taken during the American Civil War. Reproduced from *Photographic History of the Civil War*, by permission of *The Review of Reviews* Company.

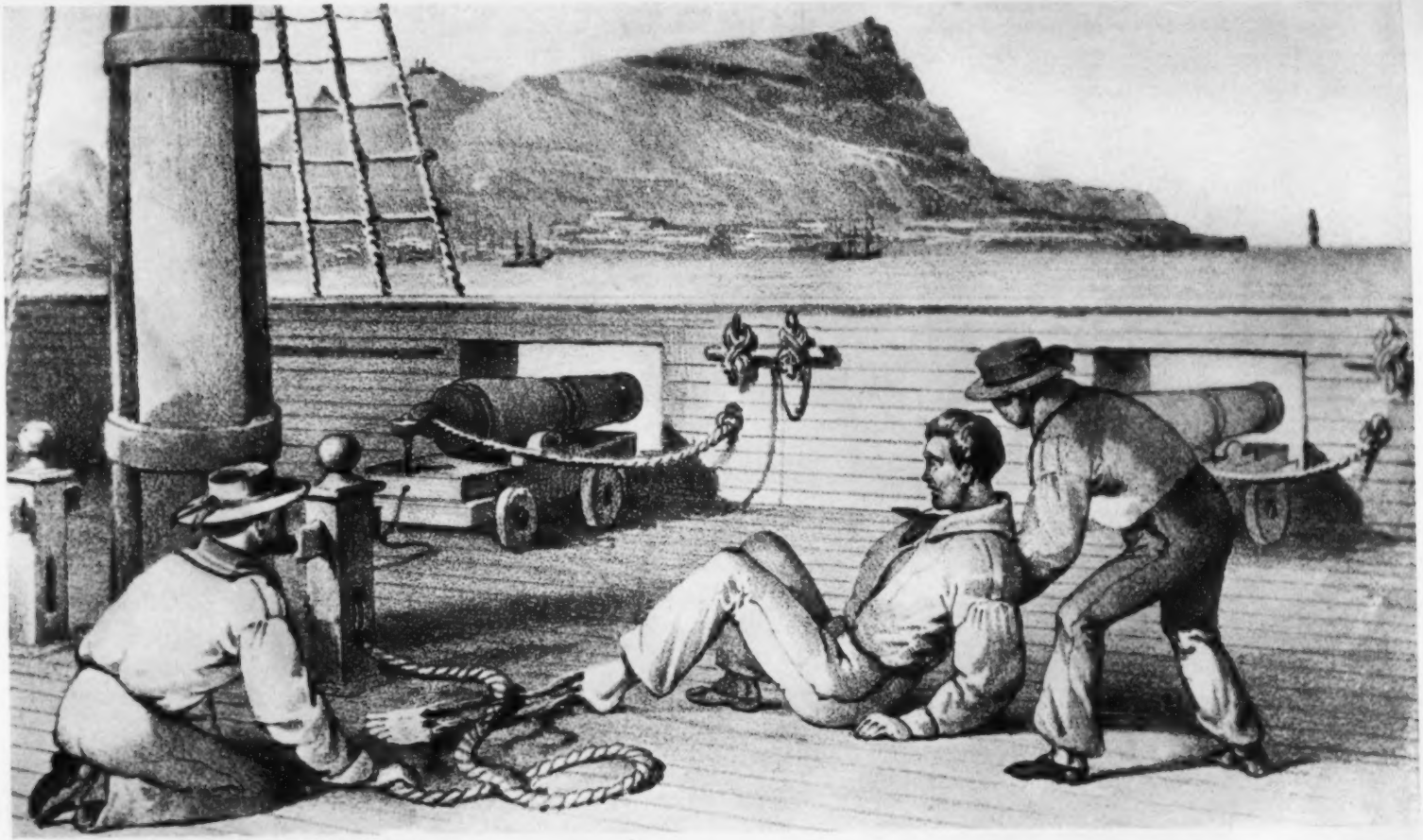


Courtesy Commander W. L. Mann (MC), U. S. Navy

SICK BAY OF AN AMERICAN NAVAL VESSEL ABOUT 1845

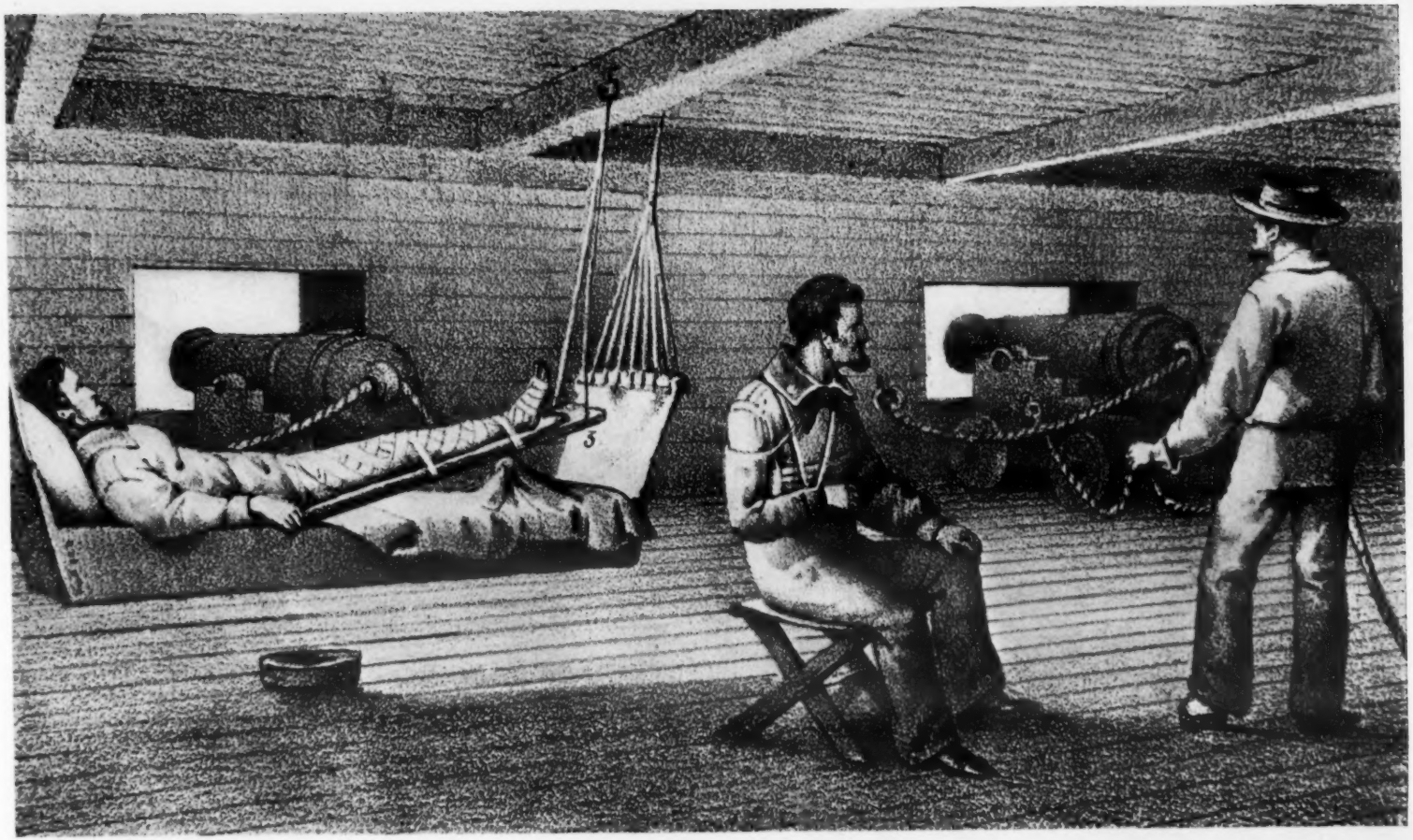
Note the canvas hospital cot and type of hammock in use at that time. The "loblolly boy" is wearing a straw hat as uniform of that period. Medicine chest is to right.

Note the canvas hospital cot and type of hammock in use at that time. The "lobbily boy" is wearing a straw hat as uniform of that period. Medicine chest is to right.



Courtesy Commander W. L. Mann (MC), U. S. Navy

AN ACCIDENT ON A VESSEL OF THE UNITED STATES NAVY ABOUT 1845



Courtesy Commander W. L. Mann (MC), U. S. Navy

INJURED BLUEJACKETS ABOARD A SAILING VESSEL OF THE U. S. NAVY ABOUT 1845

Courtesy Commander W. L. Mann (MC), U. S. Navy

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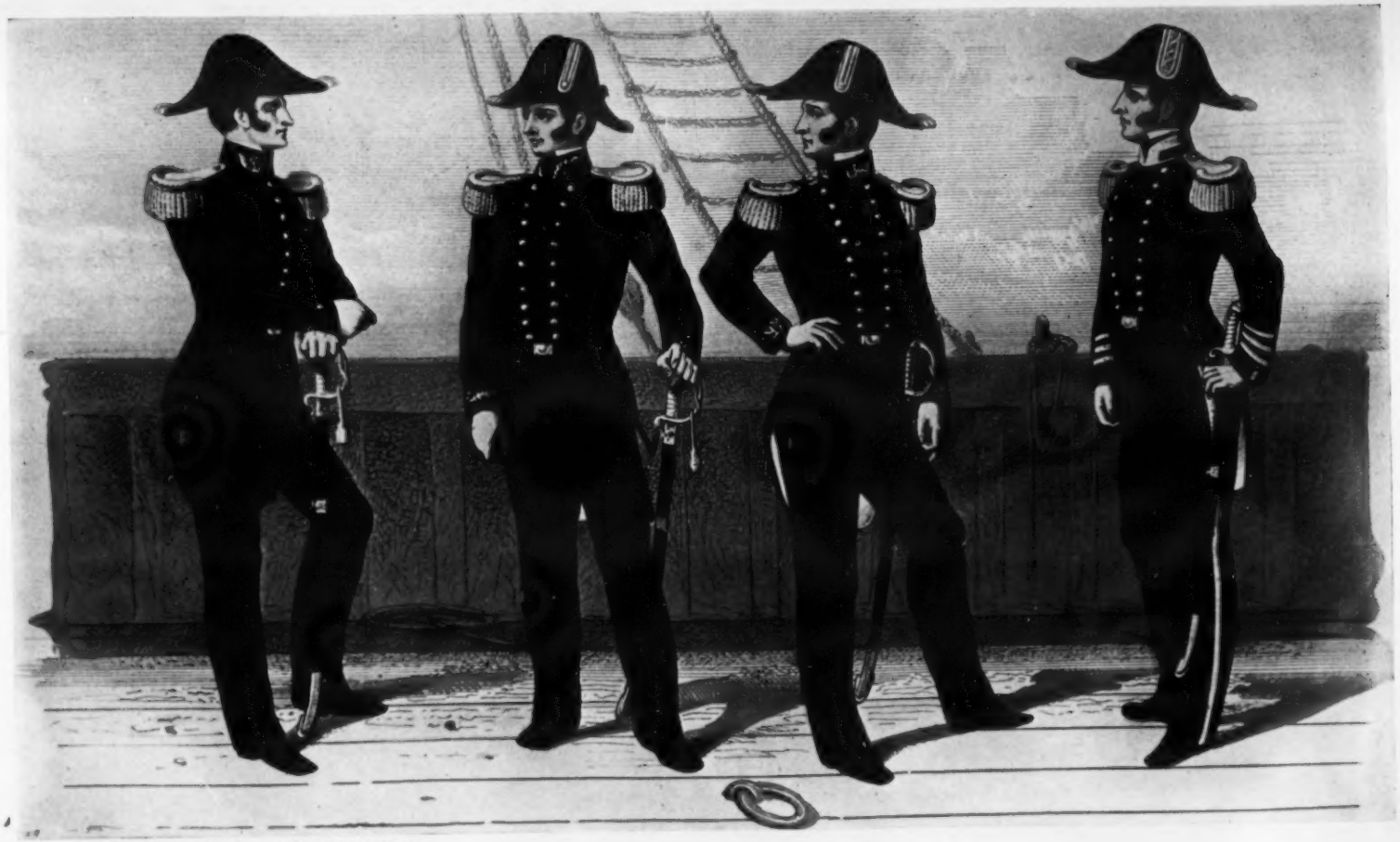
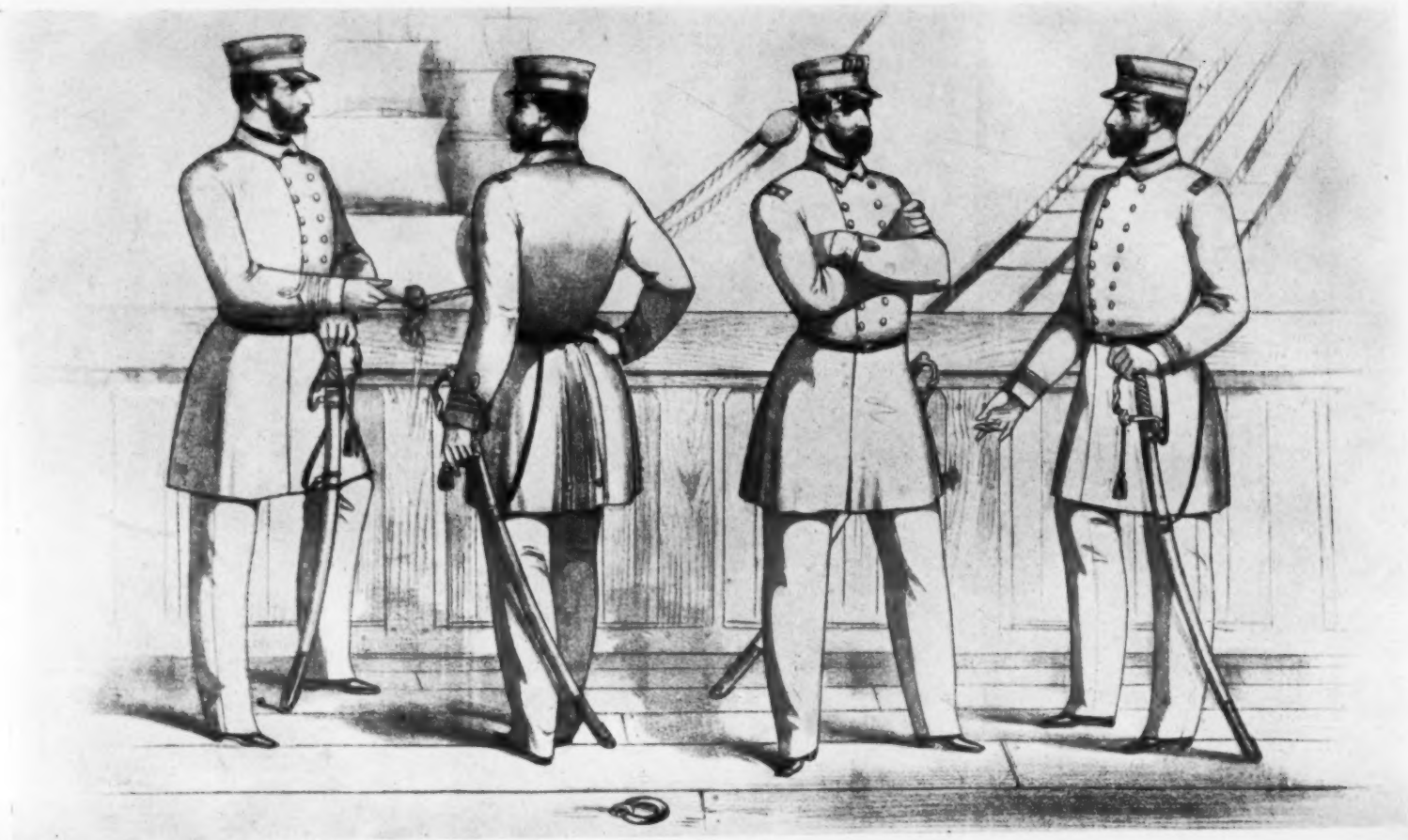


Courtesy Commander W. L. Mann (MC), U. S. Navy

STAFF OFFICERS OF THE UNITED STATES NAVY
Full dress, 1852

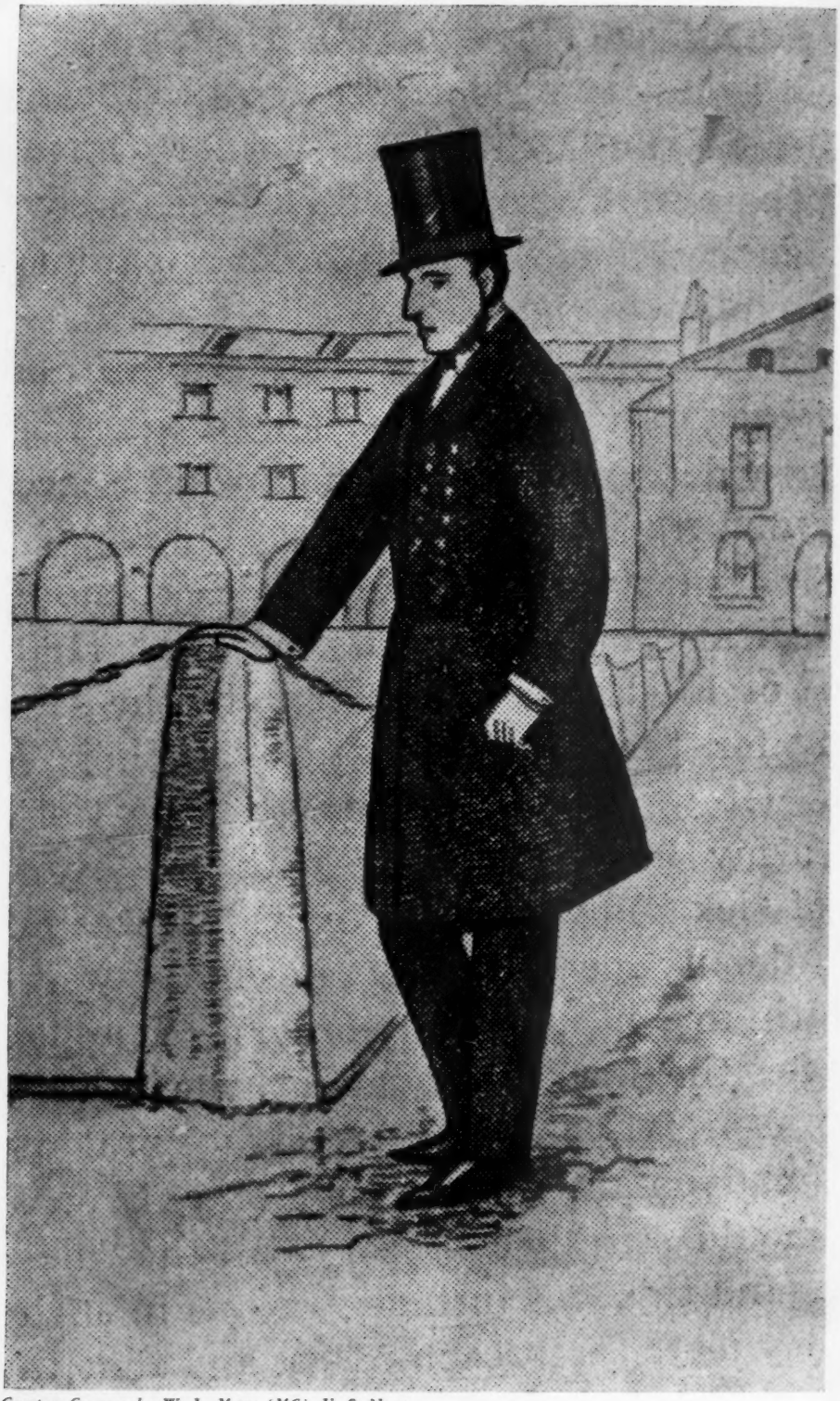


Courtesy Commander W. L. Mann (MC), U. S. Navy

UNIFORMS OF THE CONFEDERATE STATES NAVY

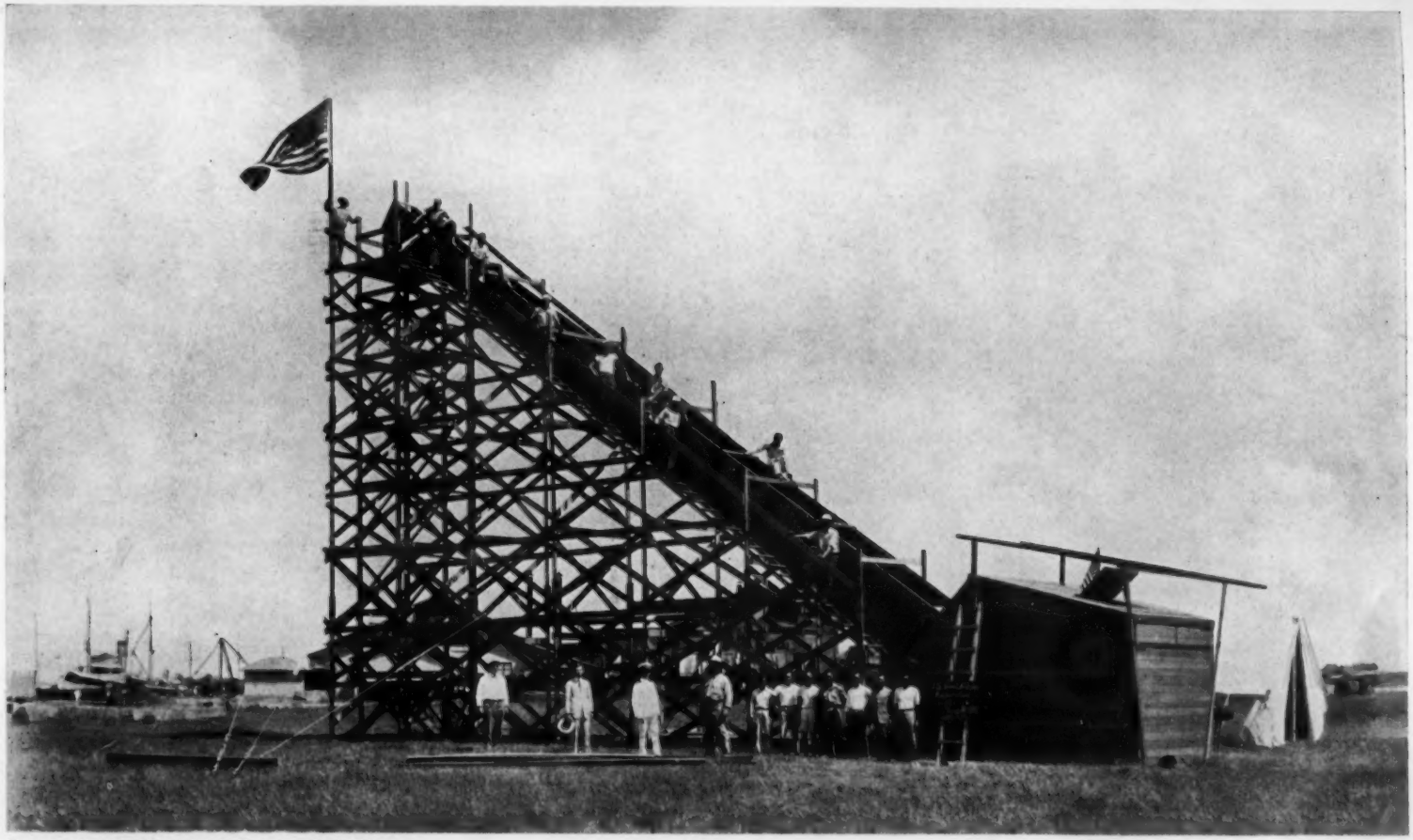
Courtesy Commander W. L. Mann (MC), U. S. Navy

A NAVAL DOCTOR IN WILLIAM IV'S REIGN
Epaulette on right shoulder, scale on left—red facings—bullion on hat.



Courtesy Commander W. L. Mann (MC), U. S. Navy

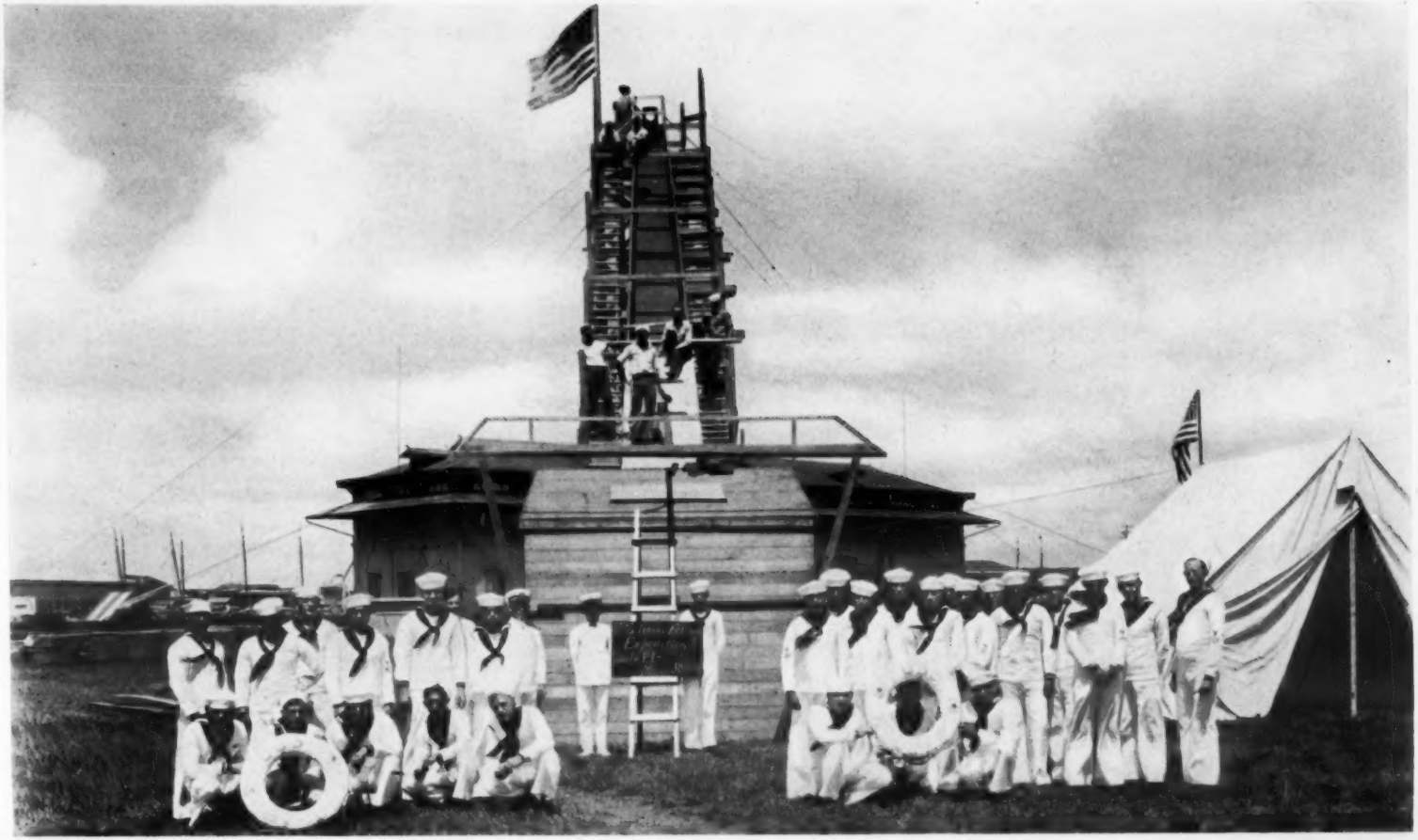
AN ASSISTANT SURGEON IN THE "SIXTIES" (BRITISH NAVY)



Courtesy Commander C. H. J. Keppler, U. S. Navy

VIEW OF SIXTY-FIVE-FOOT CAMERA WITH SUPPORTING STRUCTURE

Used by U. S. Naval Observatory Eclipse Expedition at Paus, Iloilo, Panay, Philippine Islands, to observe the corona during total eclipse of the sun on May 9, 1929.



Courtesy Commander C. H. J. Keppler, U. S. Navy

PERSONNEL OF U. S. NAVAL OBSERVATORY ECLIPSE EXPEDITION, LAPUS, ILOILO, PANAY, PHILIPPINE ISLANDS, MAY 9, 1929

Courtesy Commander C. H. J. Keppler, U. S. Navy

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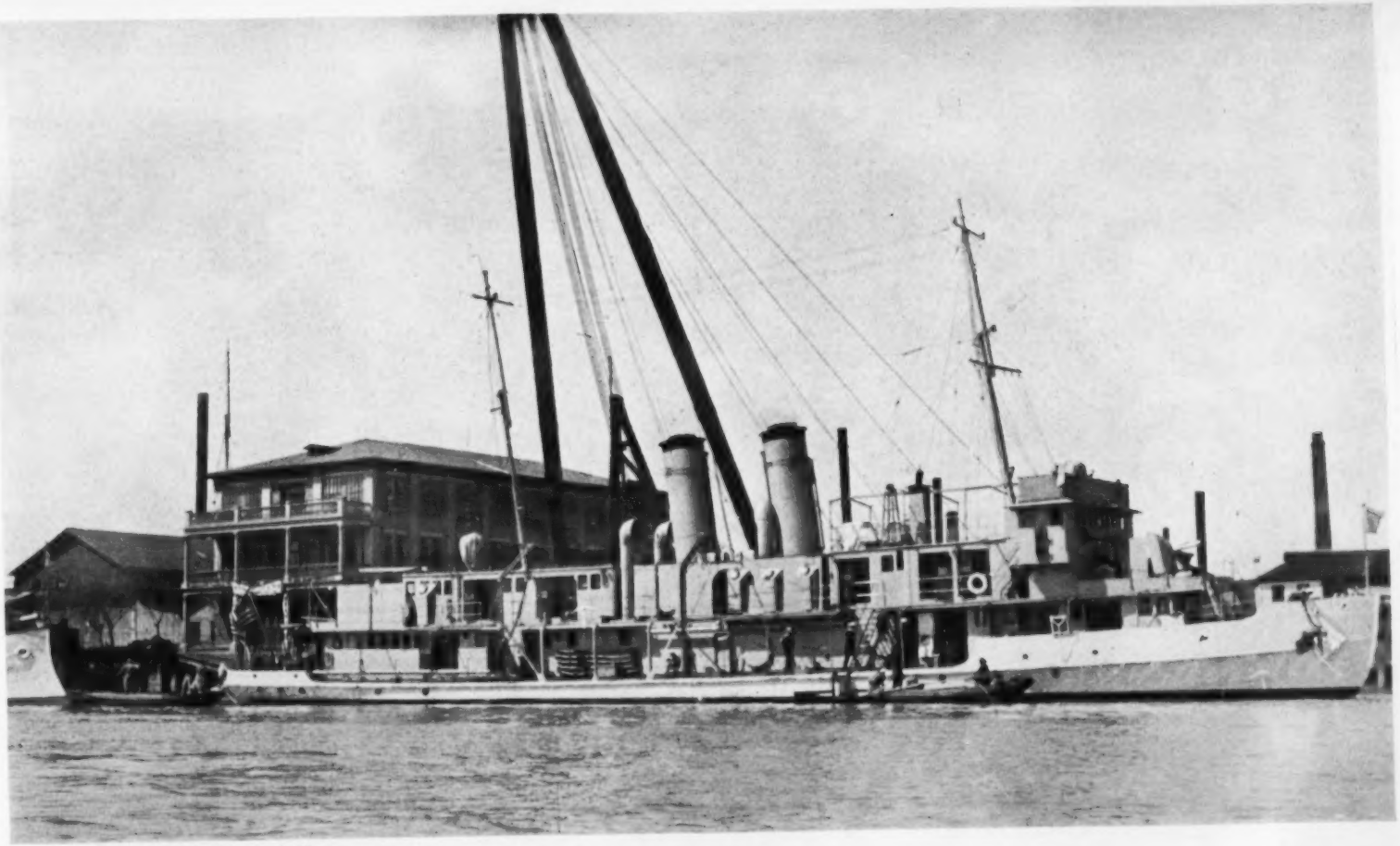
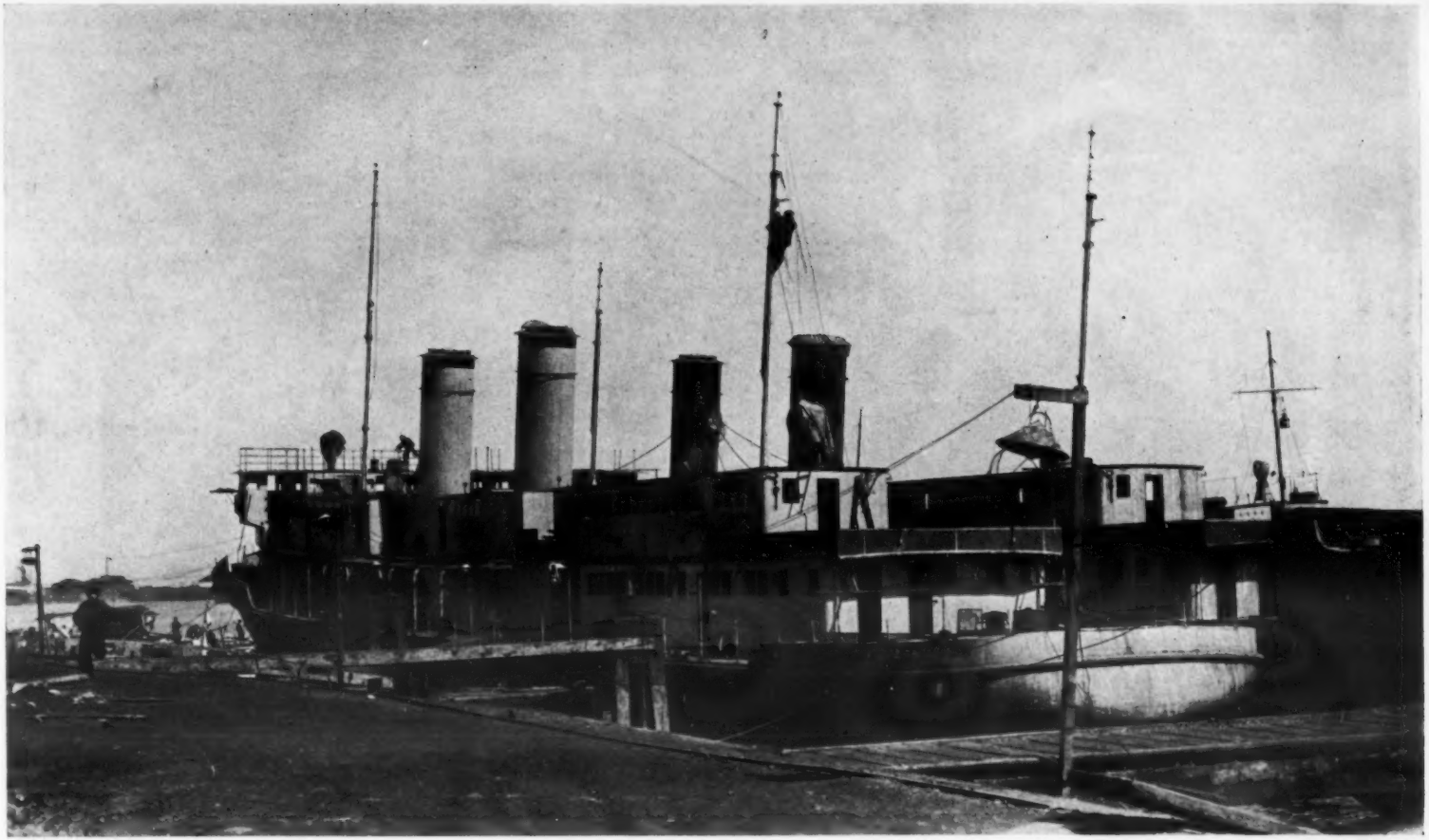


Courtesy Lieutenant E. M. Ellis, U. S. Navy

U.S.S. *TUTUILA*

Known to the "Scotsmen" on the dock as the "Tushialla."



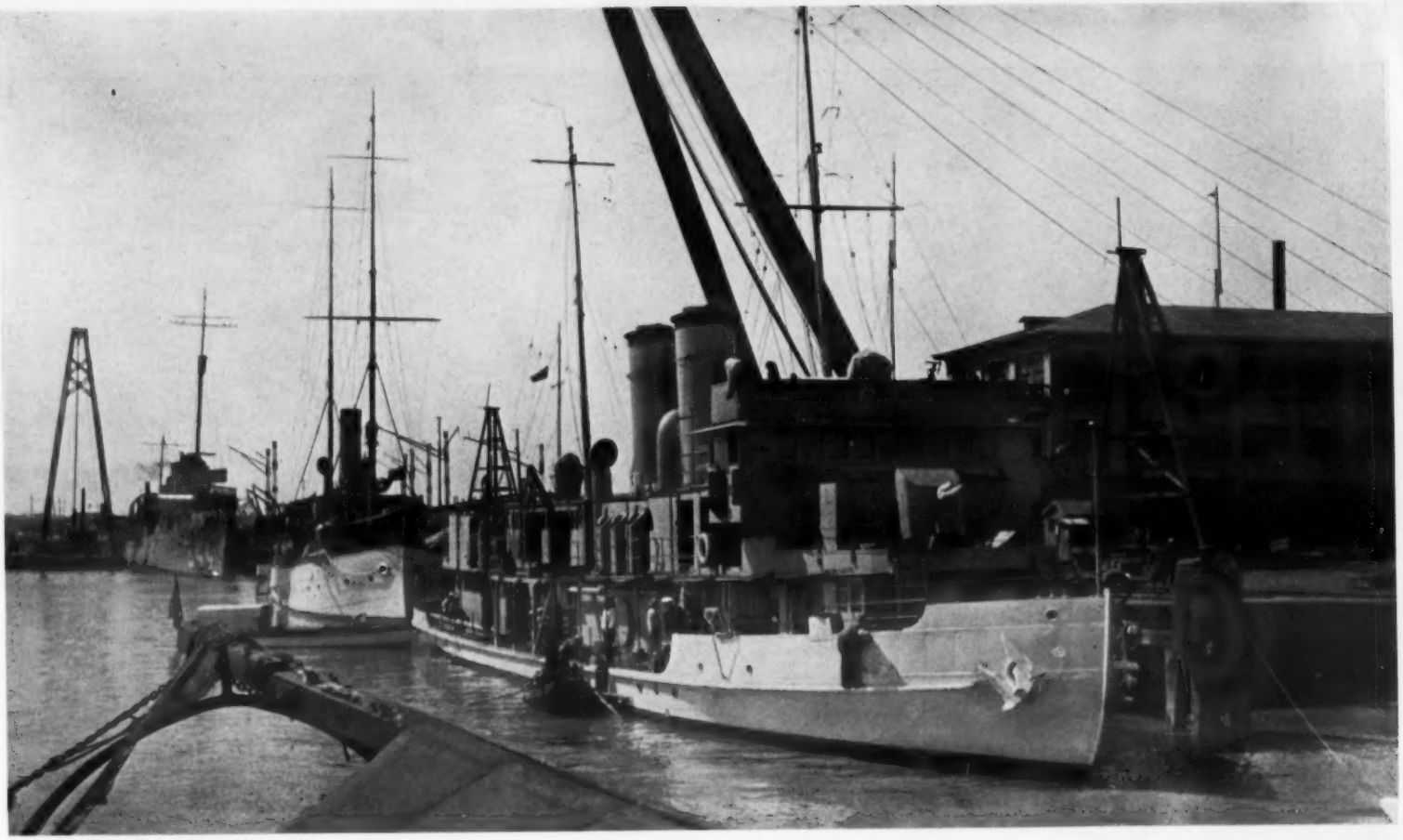
Courtesy Lieutenant E. M. Ellis, U. S. Navy

LUZON, FLAGSHIP OF YANGTZE PATROL
In the background is the *Mindanao*.

In the background is the *Mindanao*.

Courtesy Lieutenant E. M. Ellis, U. S. Navy

WHANGPOO RIVER SCENE
Looking down from the Kiangnan wharf toward Shanghai.



Courtesy Lieutenant E. M. Ellis, U. S. Navy

U.S.S. *TUTUILA*

Just before she sailed for Hankow and a shake-down cruise through the Gorges. Compare her with the *Elcano*, anchored just astern

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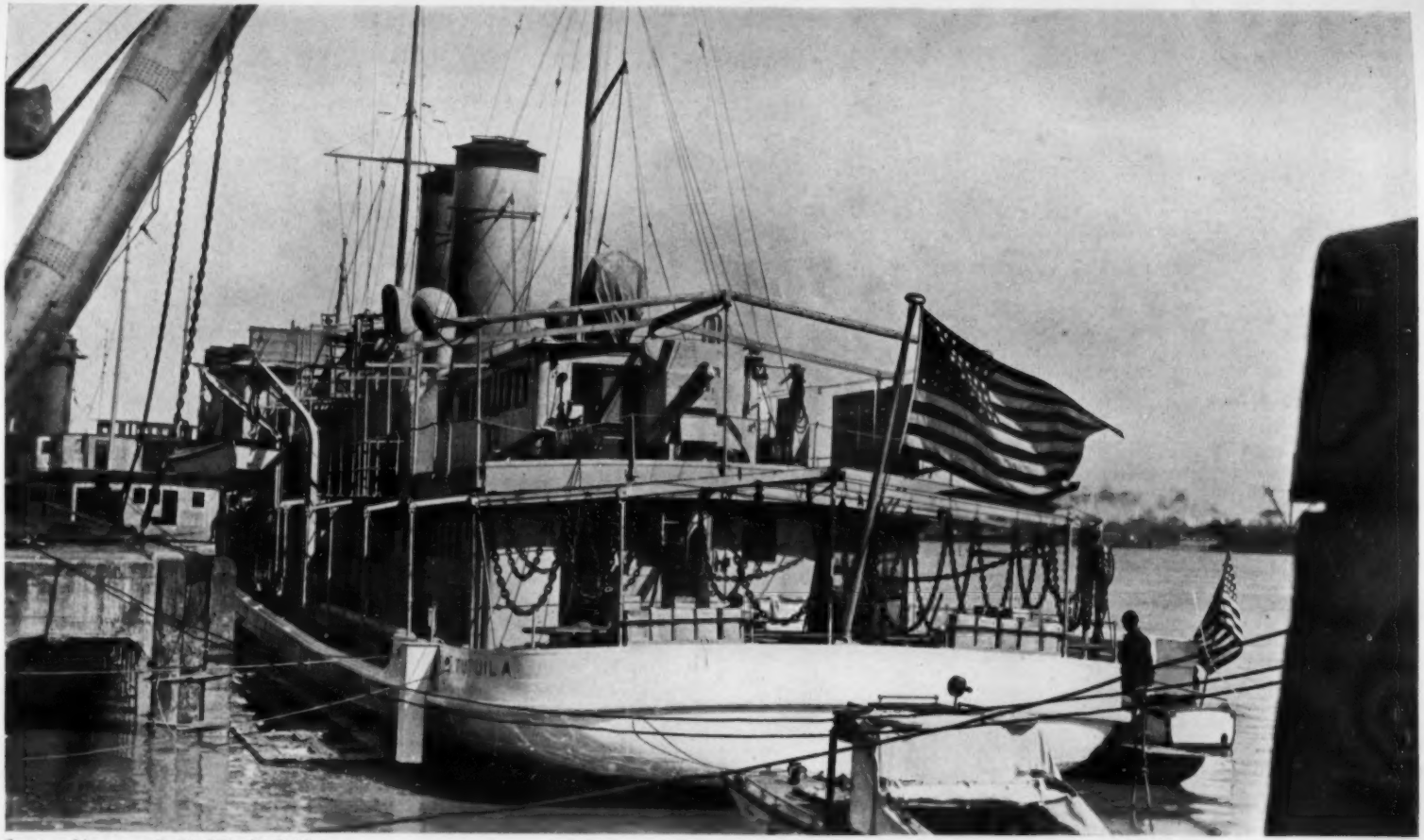
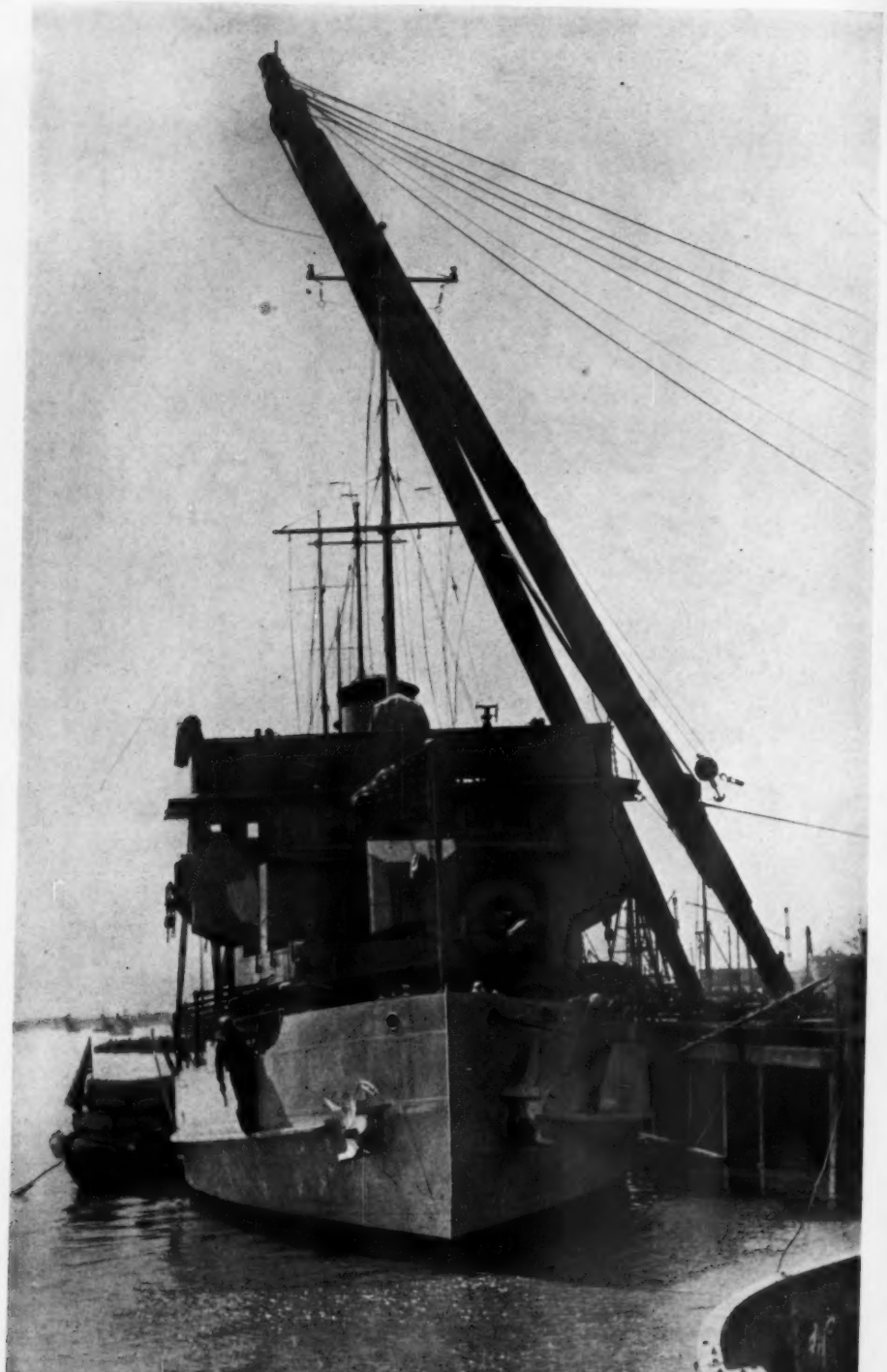


Courtesy Lieutenant E. M. Ellis, U. S. Navy

U.S.S. *TUTUILA* ALONGSIDE THE KIANGNAN DOCK
Being fitted out after her commissioning on March 2, 1928.



Courtesy Lieutenant E. M. Ellis, U. S. Navy

U.S.S. *TUTUILA* BEING TOUCHED UP AFTER HER ACCEPTANCE AND COMMISSIONING

New Gunboat Construction *at* Shanghai

By LIEUTENANT *(J.G.)* E. M. ELLIS, *U. S. Navy*

DURING March, 1926, contracts were let to the Kiangnan Dock and Engineering Company at Shanghai, China, and construction was begun on six new gunboats. Commander Bryson Bruce, U. S. Navy, and Commander L. S. Border (C.C.), U. S. Navy, accompanied by a small staff, set up shop in an office at the Kiangnan works and assumed the task of supervising the building of the *Luzon, Oahu, Mindanao, Panay, Guam,* and *Tutuila.* These six were to replace the *Helena, Pigeon, Penguin, Elcano, Villalobos,* and *Pampanga,* traditional relics of doubtful origin that had been making colorful cruises from ten to fifty years. The need that we had for these new gunboats can be told very positively by the officers and men of the *Villalobos,* which, caught by too much draft for escape in the receding water of the falling river, remained for the winter in the "deep hole" at Changsha and was aground on her own ashes long before spring. The officers and men who that same spring experienced a trip up the Yangtze with a rising current against which the *Elcano* ran all day at full speed and made good but fifteen miles over the ground, might also assist in the story of how badly they were needed.

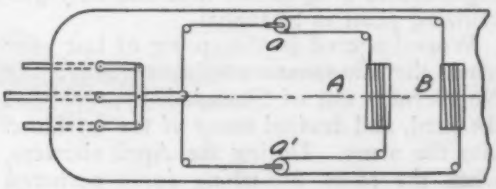
The gunboats were to be built in three sizes: *Luzon* and *Mindanao,* 198 feet long, 31 feet beam, displacement 615 tons, and draft of 6 feet; *Oahu* and *Panay,* 180 feet long, 28 feet beam, displacement 474 tons, and draft of 5 feet 6 inches; *Guam* and *Tutuila,* 150 feet long, 27 feet beam, displacement 378 tons, and draft of 5 feet 3 inches. The *Luzon* and the *Panay* were for South China duty, while the other four were to be used for Yangtze River patrol.

To get the minimum draft, with the required power, reciprocating engines had to be used. Two of the engines were to be made in the Kiangnan machine shops, while those for the other four were to be made in the navy yard at New York and shipped out east to be assembled and fitted. Boilers and pumps were to be from standard stock, but water supply had to be given special consideration. Due to the abundance of cholera and typhoid fever along the Whangpoo and Yangtze rivers, low pressure evaporators could not be used for fear that germs might carry over with the distillate and prove fatal. A high-pressure type system was planned, in which the water must first be filtered and then subjected to sufficient heat of evaporation to insure safety.

One particularly likable feature is the ice plant and cold room. Experience of long periods away from markets for fresh provisions proved that space had to be provided where perishable vegetables sufficient in quantity for a cruise of four weeks could be kept at a chilled temperature. In addition to this, if required, a ton of ice each day may be had as output.

Most river boats have the propellers acting in tubes formed by the shape of the bottom at the stern. This supposedly well-founded principle was to be absolutely disregarded and our gunboats made with faired sterns. This later proved its worth, it seems, when the *Guam* and *Tutuila* made a knot more than their contract speed.

Failure of steering gear is the outstanding cause of many accidents on the Yangtze River. To get around this, a three-rudder steam steering system is to be so arranged that stand-by hand steering can be substituted on practically instantaneous notice. This is done by having the hand gear always engaged. The wheel ropes are rove through as shown in the diagram.



Courtesy Prof. W. E. Farrell, U. S. Naval Academy

A and *B* are drums attached to the steam steering engine and hand wheel respectively. Two movable sheaves, aá, are fastened to the ends of the tiller chains. Drum *B* is held secure by a pin that prevents it from rotating. The steering engine is controlled by the regular differential valve through a reach rod. As the engine turns drum *A*, the hand drum *B* is locked, tension is put on *a*, and *a'* is slackened. The wheel rope reeves through the movable blocks at *a* and *a'*, allowing the rudders to be pulled over. In the event that the steering engine breaks down, drum *A* becomes fixed. The pin holding drum *B* is pulled out and the steering action is immediately transferred to the hand gear on the bridge.

Construction commenced briskly enough, but review of the contract brought out that bullet-proof metal galvanized by the "hot process" must be used. None could be had in Shanghai in sufficient bulk at any price. Lieutenant Commander J. W. Fowler (C.C.), U. S. Navy, solved this problem quite easily by manufacturing a galvanizing plant and schooling the Chinese in its use. The "hot process" of galvanizing iron derives its name from the action of plunging a plate, cleaned of scale by friction with the aid of acid, into a molten zinc bath. Mr. Fowler planned three tanks to do this, one for pickling, a second for a washing tank, and a third for the zinc bath, all of which had to be made in the Kiangnan shops. The first tank completed was too short and was consigned to the junk heap, just full of "me no savvies." Three were then made according to prints, a blower and a burner provided, and the process started. Success was slightly hampered, however, when "John Chino," before going home one night, turned the fires out under the tank, and allowed the "dip" to be ruined by forming a solid. After four days' heating again, the zinc was still solid. It had to be chipped out and thrown away. The system, mastered at last, allows the Kiangnan engineers to brag of the first and only galvanizing plant in Shanghai.

Work lingered in the spring of last year when the Cantonese contingent drove the Northerners out of Shanghai, appropriated the yard, and drafted many of the workmen into the army. During the April showers, when the same disturbing force cornered the umbrella market, dispatched all available umbrellas to the Nanking soldiers, and heartlessly left the gunboat workers exposed to the elements, those that remained were practically useless, because a Chinese works little, if at all, in rainy or misty weather. Soon after this, the contract was apparently doomed to be brought to a close when the Chinese admiral in charge of Shanghai issued an ultimatum to the effect that a rusty old barge should be converted into a gunboat in twenty-four hours, or off would come the heads of all concerned. The task seemed so impossible that everyone threw up his hands in despair, but in view of the unmistakable penalty involved, something had to be done. The matter ended by the miraculous conversion of the barge into a snappy man-o'-war; and the work on our gunboats continued. Fortunately for the U. S. Navy, the contract for these gunboats was let to a yard run by the Chinese government. Even after the Kiangnan works fell into the hands of the Nationalists, the work continued. Agitators spread propaganda against it, of course. Some recommended that they be taken over for the Cantonese cause, while others said that it was foolish for the government to build ships that would later be engaged in shooting at them. Without doubt, had the construction been going on at any other yard than at the Kiangnan works when Shanghai was captured, the boats would never have been finished; but finally, on December 28, 1927, the *Guam*, and on March 2, 1928, the *Tutuila*, were commissioned.

The *Guam* and the *Tutuila*, the two smallest of the group, have 150 feet length, 27 feet beam, and draw about 6 feet of water loaded for a steaming radius of two thousand miles. For these two ships, the engines were made in Shanghai by the Kiangnan Company according to English machinery standards. These engines have about the size and appearance of those that were installed on the torpedo boats of the *Biddle* class, with the exception that the slow, hand-working, painstaking Chinese has burnished and polished each piece until the assemblage is as shiny as the inside of a watch. Contract speed was set at fourteen knots, but on their trials, each did better than fifteen. Engines for the other four were made in the New York Navy Yard. Choice between the two types naturally leans toward home production, because of the

different standards in machine threads used. English standard has one more thread per inch than United States standard, and nuts to fit such threads are as correspondingly peculiar. As the auxiliary pumps are divided between Blake-Knowles and Weir type, the necessity arises for the two boats already completed to carry a double allowance of wrenches and threading tools.

Two Thornycroft boilers, each fitted with three Thornycroft burners and one Ray burner, easily furnish sufficient steam to drive the engines at 375 revolutions a minute. Lighting and power are obtained from two Westinghouse generators of the latest twenty-five kilowatt type, supplemented by an auxiliary kerosene-engine generator of the Westinghouse twelve-and-a-half kilowatt type for use at anchor during summer months. Commander Bruce has had unlimited freedom in laying out the machinery units, and he has used his skill and experience in planning and forming one of the best balanced engineering plants imaginable.

The complement calls for three line officers, a medical officer, and forty-seven men. Quarters are spacious, comfortable, and, owing to their location above decks, are expected to be cool and well ventilated. The junior line officer is engineering and disbursing officer. All the other tasks aboard fall to the lot of the executive officer. Of his numerous cares, perhaps the least will be his gunnery schedule. The *Guam* and the *Tutuila* each carry two 3-inch 23-caliber guns and eight Lewis machine guns in specially protected mounts. To people who have been in the recent trouble on the Yangtze, these seem like excellent sporting arms to pot at ducks on a trip up or down river. However, they are quite sufficient for upper river protection. Due to poor accommodations, if any, in the line of hospitalization in Chinese ports, minute detail has been observed in fitting out a sick bay in which the medical officer can perform all minor operations with ease. This is perhaps the most pleasant space on the ship.

Work at present is being concentrated on the *Luzon*, in order to finish her trials by May. With three out, the rest, aided by the penalty clause in the contract, will rapidly follow. All of these ships were scheduled to be commissioned by March, 1927, under penalty of forfeiture of twenty dollars per ship for each day up to three months, and forty dollars per ship for each day until completion of the contract. When the Kiangnan authorities found that they were in a position to lose money, they protested and asked for an extension of the time limit. With true Chinese imaginative genius, they presented their request with the excuse that too many rainy days were the cause of the delay. Commander Border investigated this and found that the normal rainfall for Shanghai is forty-nine inches. During the past year the weather bureau recorded fifty inches of rainfall. The request was returned with the endorsement that, as no abnormally stormy conditions had existed, the extension was not approved. The same request was re-submitted with reasons to the effect that because of all the troubles in Shanghai, the workmen would not produce on days half as rainy as before. On this request, half the time of extension requested was allowed.

Barring more uprisings and rainy days, the remaining three boats should be away by November. Then the Yangtze River will be patrolled by a U. S. Navy that does not have to bow to current by waiting for the sun to come up and dry a heavy dew before proceeding through the famous gorges.

U. S. S. "Outside"

By LIEUTENANT NEIL B. MUSSER, *DE-F, U.S.N.R.*

DURING two years of duty on the U. S. S. "Outside" I have observed conditions in civil life at closer range than is possible for most naval officers. Remembering my own misconceptions, and the fallacious statements concerning the commercial world which were frequently made by my brother officers, I have decided to make this attempt to describe the U. S. S. "Outside" for the benefit of those I left in the service. It is hoped that the following paper will assist officers who resign in making the necessary readjustments, and that it will convince those who remain in the Navy that many of the conditions which they find unsatisfactory in the service also exist in civil life.

My experience has been confined to work in a large corporation, and my remarks may not apply to conditions found in small organizations. It is my belief, however, that few officers would be satisfied with employment in small companies. Naval officers are of necessity different from civilians in their manner of thinking and reacting, and the first step which an officer must take after resigning is to completely readjust his life. It is much easier for a large company to absorb an officer and carry him through this period than it would be for a small organization, where the staff of trained men is limited to a few experienced people, each of whom is expected to carry a full share of the work from the start. The small companies find it necessary to draw their engineers and technical assistants from large corporations which have given them their training.

Furthermore, I do not believe that the average naval officer would be satisfied in civil life after leaving the secure haven of the Navy, if he entered the service of a small company which could not afford to offer sickness insurance, retirement benefits, and annual vacation periods with pay. Only the very largest commercial organizations have been able to offer such employee benefits, and those offered are seldom as generous as corresponding benefits enjoyed by naval officers.

In a small company there is a feeling that the "boss" is digging down into his own pocket to give the employees their pay. Salaries are on a much less personal basis in large organizations, but in large companies increases of pay are liable to be slow, due to the lack of intimate contact between an employee and the executive who is responsible for his salary. Another disadvantage of a small company is the tendency of the employer to be content to let his young engineers remain at the work for which they appear to be best suited, rather than train them in all branches of the business to fit them to assume executive responsibilities, as is the practice in some of the largest commercial organizations. However, in all civilian companies it is left largely up to the individual to exert the necessary pressure to secure periodic promotions or increases in pay, and to "sell" his employer the idea that it would be to the best interests of the company if the nature of his work were so varied as to fit him for the higher positions in the management. In the Navy, on the other hand, all such matters relating to pay and promotion are arranged by law and custom.

With a large variety of specialties within the line and several staff corps to which young Naval Academy graduates are eligible, it is comparatively easy for a naval officer to find the type of work for which he is suited, and to obtain an opportunity to develop along his chosen line of endeavor. Since officers are apt to lose sight of the breadth of field covered by the various ramifications of their profession, it might be well to dwell for a moment on this point. Consider, for example, the varieties of engineering which must be undertaken by naval officers in regard to research, design, construction, operation, and maintenance of the great variety of materials used by the Navy, including ships, aircraft, and shore establish-

ments. Consider the openings in the fields of administration, law, diplomacy, literature, secret service or "intelligence" work, and a variety of other occupations. These permit the widest scope for diversification of interests or the most intense specialization, depending on the tastes and abilities of the individuals concerned.

Taking the Construction Corps as an example, we find that even in this relatively narrow field of work it is possible to specialize in the design and construction of various types of warships, aircraft, and auxiliary vessels, in the administration of naval industrial plants, and in a number of other scientific and engineering activities. Naval constructors must not only be able to design, construct, and repair the hulls of ships and aircraft, but they must also have some knowledge of almost every form of engineering in order to coördinate the design of the vessel or aircraft and its armament, machinery, and protection, and to supervise the design and manufacture of a great many articles of equipment for the vessel. Their work therefore requires a knowledge of such widely varying subjects as ship and aircraft design, marine engineering, boiler and turbine design, structures, many forms of advanced mathematics including rigid dynamics, thermodynamics, and hydraulics, and the theoretical and practical working of direct-and-alternating-current machinery.

We might therefore classify the work of the naval constructor under the headings of Materials and Personnel, since we find members of this corps working with the problems of providing the Navy with the materials it requires for effective operation, and managing the civilians and enlisted men who design, produce, inspect, or repair these materials. As will be seen by the following list, a great variety of work is available for even this relatively small corps, which is sometimes believed to lead a uniform and monotonous existence so far as type of duty and geographical location are concerned. The percentages given are based on the 1925 Navy Register.

Type of Duty	*Percentage of Membership Assigned to this Duty*
Design and Miscellaneous Administration (Navy Dept.)	14.9
General Construction Duties, Ships and Aircraft	55.2
Inspection	13.1
Instruction (M. I. T., Naval Academy, War College)	13.6
Foreign Service (chiefly Attaché and Advisory or Consulting Duties)	1.4
Sea Duty (Repair Officers of Tenders and Repair Ships, Staff or Consulting Duty)	1.8
Total	100.0

(Note: The total membership was 221, or about 5 per cent of the line.)

We see therefore that in the small corps discussed above there is almost unlimited opportunity for specialization and for selection of type of occupation. When a young man in commercial life finds himself unsuited to his work, he is fortunate indeed if the company employing him is so organized as to permit his readjustment to a new occupation without making it necessary for him to resign and to lose the benefit of several years of experience in that organization. In fact, it can safely be said that no commercial company offers as great a variety of work from which a young officer can choose his career, or as great an opportunity for a misplaced individual to obtain a transfer to some other part of the same organization, as does the Navy. While it is not always easy for a naval officer to determine in advance what class of work he will be best suited for, every encouragement is given to all promising young officers to assist them in finding those niches into which they will fit best. When we think of the large numbers of civilians of education and experience comparable to those of a naval lieutenant who are grossly misplaced but who are held to their tasks through economic necessity, we realize how favorably the Navy compares with civil life in this regard. It should be remembered that a young officer is apt to demand perfection in adjustment to his occupation, whereas the best that should be hoped for is an opportunity to harmonize most of his characteristics with the occupation he has chosen, accepting certain conflicting influences as inevitable.

The matter of leave of absence is probably more important in civil life than in the Navy, since it permits the civilian to obtain the change of scene which officers are apt to accept as a part of the day's work, without due appreciation for the educational and recreational advantages which they enjoy through travel and constantly changing bases. Not even the largest commercial organizations offer more than two weeks' vacation with pay each year, and only the older em-

ployees whose services can be spared are given additional time off without pay. The small companies make no attempt to grant vacations with pay, but most of them will permit their employees to be absent two weeks each year, with loss of pay.

I often recall with pleasure one year of my naval service during which I was granted three months and one week of leave with pay, two months to take a scientific collecting trip and five weeks to make an ocean voyage to Hawaii and Puget Sound which I had never visited before, with free transportation in both cases on naval vessels. These trips were welcome breaks in a tour of shore duty spent largely at an office desk. Later when I resigned, I received a month and a half of leave with pay, which was of considerable assistance to me in getting properly located in civil life. Such generosity regarding leaves of absence would be simply unheard of in the commercial world.

Finally, an officer who resigns is apt to miss the glamour of the service, and the prestige which he has learned to accept as a matter of course. By obtaining a position with a large company, it is possible to retain a part of the prestige which would otherwise have been lost by resigning from the Navy.

Assuming, then, that a former officer obtains a position with a corporation somewhat comparable in size with the Navy, let us discuss the most common fallacies which are generally accepted as truth by young officers who are not wholly satisfied with their occupations. First it is stated that the Navy is more bound up with paper work or "red tape" than are outside companies of similar magnitude. If every officer who believes that this is true would spend one leave period studying the organization and system of one of the large automobile plants, railroads, or oil companies, he would realize that the Navy is highly efficient in this regard. The Navy could well be excused for having a greater amount of system than private companies, since in the service there is a double system of accountability. Funds are obtained from Congress under various appropriations, each of which must be accounted for separately; and military and industrial efficiency require that another entirely different system of recording and reporting costs be used to permit those in authority to obtain the maximum benefit for the government from every dollar spent.

Personnel matters are much more complicated in a military organization than in an industrial plant so far as records are concerned, although it is true that the Navy is spared any dealings with shop committees, trade unions, etc. In civil life the employer has no hold on his men beyond the wage or salary contract, and the employees are responsible to the civil authorities even while at work. Also, the provision of additional forces in times of emergency is difficult in the Navy, where there is no market of trained men from which the recruits can be drawn by simply offering sufficient pay to attract idle or less advantageously employed men.

The most severe critics of the Navy's system are the younger officers who have not served on duty in the Department, where they would have had to depend on full and accurate reports from the fleet and shore establishments for their knowledge of what was happening under the ever changing circumstances encountered by the operating forces in the field or at sea. The highly trained major-caliber gun turret has been rightly termed the most marvelous example of organization and training which can be seen anywhere in the world; and this and the other activities afloat and ashore in naval establishments which reflect a uniform degree of efficiency and *esprit de corps*, indicate that the system under which the whole organization is directed is fundamentally sound. There is a continual evolution of the Navy's system, and changes are made during each administration which simplify and modernize paper work and procedure, making them more adaptable to both the peace- and war-time needs of the service.

The second misconception which I desire to point out is the belief that the system of pay and promotion in the Navy is less conducive to the development of efficiency, energy, and initiative than that generally used in civil life. In this age of promotion by selection and retirement with length of service, we can safely assume that the relatively few officers who reach the higher ranks are on the whole the best, although there will of necessity always be individual cases where exact justice is not received. In commercial life, on the other hand, promotion depends to a large extent on the employee's ability to "sell" his "boss" the idea that by granting him an increase in pay the profits of the company can be definitely increased. This is sometimes very difficult to

accomplish, and efforts to achieve the desired end are apt to detract from the attention which can be given to the work at hand. Furthermore, the head of each department of a large company is held responsible by the directors for keeping the total pay roll of his branch of the business as small as is consistent with efficient operation.

The next fallacy we have to consider is that a naval officer has less opportunity to exercise initiative and has less authority and responsibility than a civilian of corresponding age and training. My experience and observation have been quite to the contrary. At twenty-seven years of age as a lieutenant I was placed in charge of the isolated drydock *Dewey* and shore shops, employing an average force of about 350 workmen and 25 supervisors of all shipbuilding trades. The fact is that from the day of graduation, an officer can assume all the responsibility that he is willing to carry, and he will find that ample authority is granted in proportion to the responsibility he has shown himself worthy to carry. A young naval officer is simply embarrassed by opportunity, and is given every encouragement by his superior officers, none of whom feel that they will lose their jobs because of the youngster's success. There is no condition in the Navy similar to that which is sometimes observed in civil life, where a senior discourages the junior's assumption of responsibility and withholds the benefits of experience and accumulated knowledge, in the fear that the junior will become able to replace the senior. Every high-ranking naval officer accepts the fact that he will be replaced by one of his younger brother officers, and although a similar condition prevails in some commercial organizations, the Navy benefits by the comparison.

One thing which sometimes is lost sight of by naval officers is the opportunity afforded in the service to obtain postgraduate instruction and to carry on studies and educational courses during the spare time which most of them enjoy. The Navy is advancing with the tide of general industrial development, and the need for specialization and for narrowing the field which any officer must cover if he is to be successful and give the proper intensity of effort to his work is being recognized. Except while attending the various postgraduate courses, this educational process must depend on individual study, but with the excellent foundation which every officer has received at the Naval Academy, self-instruction should be highly satisfactory.

It is sometimes stated that naval officers are poorly paid and have much less opportunity to accumulate wealth than have civilians of corresponding age and training. This is true of the higher ranking officers, but is decidedly untrue of the younger officers, who are very well paid according to civilian standards, especially if we evaluate the benefits which officers receive. Considering medical and dental attention, vacation periods, free hospitalization and unlimited sick leave with pay, retirement, and other benefits, we see that the pay of an ensign just out of the Academy is well above that of a young civilian college graduate. The fact that promotions will follow each other with regularity and certainty, and that nobody with any ability at all will lag behind, compensates young officers for the futility of hoping to forge ahead of their classmates or running mates. The travel allowances and transportation of dependents and household effects granted to naval officers are more generous than those given by many large companies in civil life, which counters the statement that naval officers' negative bank balances are due to their frequent changes of residence.

I believe that efficient living and systematic saving are just as easy for an officer as for a civilian, and that it is possible for a naval officer to budget his expenditures and invest his surplus in such a manner as to build up a small fortune before he retires. I used to look upon naval officers as congenitally improvident individuals, but I have seen just as little thrift among civilians employed by large corporations who are almost as sure of old-age pensions as naval officers are sure of retirement. It seems that a person must be thrifty by nature, or must be living in fear of a penniless old age, if he is to lay aside an appreciable part of his income during these times when salaries, both in the service and out, appear to lag behind the prices of those luxuries which have been produced in such profusion and have received such a wide distribution among persons of all social classes that they have assumed the nature of necessities.

It is certain that anyone familiar with

the thorny path of a young doctor or lawyer who has no capital with which to support himself during his first five years out of college, and no powerful friends or relatives to help him build up a practice, will not consider the young naval officer poorly paid. In connection with the above it should be remembered that the doctor or lawyer frequently spends seven years in college and two years of interne or law-office-clerk "hack" work, at the cost of many thousands of dollars to himself, before he can even begin the struggle for a living.

The civilian engineer fares better at first than a doctor or lawyer. After four or five years of college, salaries of between $125 and $150 per month, without any benefits, are not difficult to obtain from large companies. For one of these engineers to reach a salary of $336 per month cash and several hundred dollars per month more in benefits within seven years after graduation, as is possible for a naval lieutenant, would be simply unheard of for any but an extraordinarily gifted "sales-engineer" or one with considerable influence to supplement his ability and insure a rapid rise.

This brings us to a point which should receive the most careful consideration from all young officers who intend to resign. When entering the service of a large commercial organization, it is generally necessary for an ex-naval officer to start at or very near the bottom. This has a twofold purpose; the officer is of practically no value to his employer at first and, since salaries cannot well be kept secret, it would demoralize the older employees if the newcomer were to receive more pay than they had reached through years of service. The smallest difference in pay between that which the officer receives in the Navy and that which he can command on the U.S.S. "Outside" exists when he is in his first pay period, and it is therefore better to resign within three years after graduation than spend years in acquiring experience which will have at best only an indirect application to his work as a civilian.

An officer should realize that when he resigns his usefulness to society is temporarily destroyed, and that nothing he has acquired in the Navy, not even his knowledge of the administration of naval and Civil Service personnel, can be applied directly in his new occupation. An exception to this rule would seem to be the case of the young constructor who resigns and seeks work in a shipyard. Shipbuilding is not one of our primary industries, and although it appears that conditions in this field will tend to improve during the next few years, there are enough civilians being trained in this work to take care of the commercial demand. It is difficult for a young naval constructor to obtain employment with a commercial shipyard unless he is willing to start work on a salary considerably below that received by his classmates in the service. The constructor's basic education and experience has been along the lines of warship and aircraft design and, although he is much better grounded in the fundamentals than a civilian who has had only four years of college work, it requires considerable time for him to learn the multitude of practical details which are foreign to his experience afloat and ashore in the Navy.

Success in civil life is more a matter of salesmanship and personality than it is of technical knowledge. In the Navy when an officer takes over a new position, his ability to handle the job is unquestioned by those immediately around him, since his authority and duties are clearly outlined in orders and regulations, and everyone he works with is either above or below him in authority and responsibility. It is true that the naval officer must use common sense and must have a pleasing personality if he is to make the greatest possible success of his new job, but he does not start out with a real handicap as does a civilian who takes over some new work. There are always men on the job in civil life who feel that they know how to do their work without the newcomer's help, and he must adopt a program of "selling" himself to everyone with whom he works, and be very slow in taking authority and responsibility away from others until he has demonstrated his fitness to take an active part in the undertaking. He will find no clearly cut line of demarcation between his rank or duties and those of the other engineers or technical assistants on the job and he will be made to feel that his presence is undesirable to some of those already at work who fear that the newcomer will encroach on their domain. Under such conditions an aggressive policy would be sure to fail, even if it were adopted by a person unusually gifted.

We now come to a few of the more personal considerations which lead some officers to look longingly toward life on the U. S. S. "Outside." We will neglect any physical disqualifications, such as chronic seasickness or acquired flat feet, poor eyesight or color blindness, except insofar as to state that in some cases of this type it would be better for an officer to obtain a transfer to one of the corps if possible rather than leave an occupation to which he is devoted.

First there is the contention that there is less home life for the naval officer than for the civilian. The inability to settle down, acquire a beautiful home, and make friendships that will not have to be broken up or interrupted every few years constitutes a disadvantage of life in the Navy for certain types of individuals. On the other hand, when an officer resigns he loses the friends in the service upon whom he has unconciously learned to depend both for professional assistance and for happiness. We all have gregarious instincts, and nobody is self-sufficient, either in a personal or business way. Successful business men admit that without friends success in commercial life is impossible or extremely difficult to attain. The Navy is like a large fraternity with a ladies' auxiliary, which takes the place of all other social and professional ties, and years are required for a former officer to build up a corresponding group of friends and associates in civil life.

Naval officers are frequently separated from their wives and families, but this tends to keep alive the elusive sentiments of love, and obviate the boredom too often felt by civilians. Officers have social opportunities which many of them would not be able to enjoy as civilians, due to lack of money or family connections; and they have opportunities for foreign and domestic travel with their families while they are still young and able to enjoy and profit by their experiences, when few civilians can afford such luxuries as travel. Furthermore, naval officers are a great deal better off than are those civilians who work under contract on foreign stations for large companies, who find it extremely difficult or absolutely impossible to obtain transfers to the United States even when ill health or similar causes make their return imperative. Any officer who believes that civilians of either the stay-at-home, commuter, or the foreign-service type have a happier lot than his should make the acquaintance of a few such persons at once. This contact would be in line with the Navy's policy to stimulate intercourse and a better understanding between the service and the people, and would in most cases be conducive to the officer's peace of mind concerning his own profession.

Some line officers feel that they have no inborn love of the sea, and they find insufficient thrill or inspiration in the seagoing existence to outweigh the discomforts which are inherent in the life afloat. Life aboard ship is monotonous for some officers, since the same faces are met with daily, and watch standing and drills break up the time and discourage any effort at concentration on scientific studies or outside activities. Although some officers feel that they lead a dog's life, they are restless to be at sea again before each of their periods of shore duty is completed. It is without doubt very difficult for an officer to lead a thoroughly hygienic life on board ship, which is liable to make officers age quickly, although this tendency is probably more than offset by the danger which confronts many civilians of wearing themselves out with the constant grind of office work, which calls for more personal attention to detail than is generally required of line officers. While it is true that the varieties of physical exercise which can be taken regularly while on sea duty are strictly limited, and watch standing and other duties interfere with the maintenance of a regular schedule, I believe that naval officers are generally as healthy as civilians who have much greater natural advantages to help them to keep fit.

Officers on shore duty are in close touch with a broad field of commerce and industry, and are able to make the acquaintance of civilians of a great variety of occupations. By studying the political and social conditions in the localities where they are stationed, officers can achieve a national rather than a local outlook. Officers on foreign duty who will devote a part of their leisure to study of the conditions observed about them can attain an international rather than a strictly national point of view.

Some officers crave the satisfaction of seeing their work in the concrete, tangible

form of something designed, planned, or constructed, while many line officers must be content for the most part in seeing abstract results. To illustrate, we might consider a crippled vessel towed to a yard after a battle. The yard officers size up the job, the repairs are made, and when the dock is flooded and the vessel steams out of the yard the superintendents in charge of the work gain their reward in the sight itself, coupled with their memory picture of the wreck that came in. How differently would they feel had they spent the same length of time in watch standing and holding drills on board ship, although the possibility of attaining a high turret score or success in battle accompanies such activity. Here again we see that a transfer to another type of work within the service would permit a realization of the desired end without resigning.

If a list were prepared of all of the compensating features of a naval officer's career it would have to include the glamour and applause which occasionally come to the line officer in time of war. There is little recognition of the services of the civilian in war time, regardless of how necessary his services are to the nation's success. It cannot be denied that pride in wearing the uniform and in appearing before the public eye are drawing cards with many officers, which they would sacrifice if they resigned. The wearing of gaudy uniforms in public by some lodge members illustrates the subconcious need many people have for being "splendid" and conspicuous.

Naval officers are sometimes oppressed by the feeling that they are subject to military law and are in danger of court-martial proceedings at all times. They feel that they are expected to know more regulations, orders, and instructions than it is humanly possible for them to learn in a lifetime. Since leaving the service I have often wondered how this feeling could be as oppressive as the fear which is always facing a civilian officer in a commercial organization of losing his professional reputation and means of making a livelihood, due to making a bad error in judgment or breaking one of the cardinal rules of proceedure or ethics. The feeling of competition for a part of the world's goods, from which a naval officer is spared, is just as depressing for some people as would be the various hardships endured by the officers in the Navy.

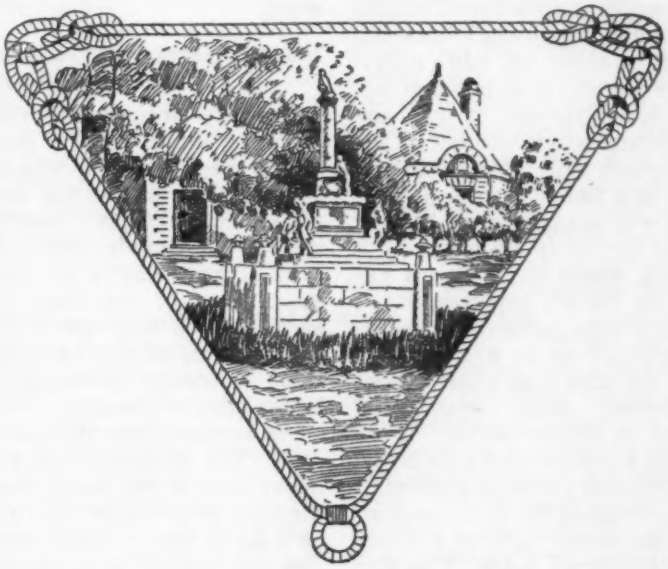
Presence at numerous drills, inspections, receptions, and full-dress functions, and the dignified and reserved bearing which it is considered necessary for officers to assume if they are to maintain discipline, are not agreeable to men with certain temperaments. However, the social and business formalities of civil life would probably be just as unpleasant, and such persons must be prepared to accept a lower social and economic standing if they are to avoid all but a minimum of formality and restraint.

The broadness of the field which naval officers must cover in education and training, if they are to be considered as theoretically qualified for promotion to the higher ranks, is terrifying to some officers, who would specialize in a narrow field were it not for their fear of discrimination against the specialist in selection. I believe that there are as many blind alleys in any large commercial organization as there are in the Navy, and that the tendency in civil life is for an officer to be forced into a specialty rather than encouraged to stay out. In either case, however, it is possible for the energetic and balanced person to master the details of a specialty without losing sight of the business as a whole, and to develop the necessary administrative skill to permit him to compete successfully for the higher positions in the organization.

I would like to advise naval officers who have no particular point of vantage from which to break into civil life to consider very carefully, before they resign, whether or not the needed improvement in their health and happiness could be as well attained by making a change in diet and habits regarding exercise, by the acquisition of a different philosophy, or by a transfer to some other work or to a corps. I would never advise an officer to remain in an occupation for which he had found himself temperamentally or physically unsuited, and I believe that many young officers who are discontented in the service would do well to resign and seek until they found an occupation which would call forth their full enthusiasm and best abilities. But there is need here for the old warning that the next field always looks greener, and many former

officers have learned that lack of perfect adjustment is easier to bear in the service than out of it.

A careful consideration of all that the adjustment to civil life will mean as regards money and friends as well as personal comfort, and a wide acquaintance with civilians and a knowledge of the life they lead by day as well as by night, will convince the average naval officer that only in the most exceptional cases would it be advisable for him to resign and start afresh on the U. S. S. "Outside." Unless an officer is certain that he possesses an unusual set of physical, mental, and temperamental characteristics which will make it impossible for him to properly adjust himself to the naval environment, with its great variety of activities from which he can choose his occupation, let me advise him to remain in the service, since in the words of Shakespeare it is safer to "bear those ills we have than fly to others that we know not of."



Adjustment *of the* Type III Azimuth Circle

By Captain F. L. Oliver, *U. S. Navy*

THE Type III azimuth circle which has been a service stand-by for many years, plays an important part in navigation and is so well known that no description is considered necessary. Although sufficiently rugged to withstand ordinary use, accidental knocks or misuse will cause derangement. When out of adjustment the fault is difficult to determine and rectify with the facilities found on board ship. An error in the circle fittings affecting azimuths, affects the course laid by the amount of the error. As an example of this relation the experience of a certain ship is given. This ship while on a long voyage had a consistent, unaccountable set of about ten miles a day. As day after day elapsed with a set of approximately the same amount, it was suspected that the azimuth circle was out of adjustment. Comparison with other circles developed the fact that none of them agreed. Later when there was an opportunity to have the circle checked it was found to be out a degree and a half, which error almost exactly accounted for the set experienced.

Many navigators send azimuth circles to the Naval Observatory or to a navy yard instrument shop for checking when an opportunity is afforded. Some repair ships are now equipped to adjust circles. Were it possible to make a positive check on board ship, much of this work could be avoided.

The commonly accepted test is to check an azimuth by the sun mirror against a direct azimuth with the terrestrial vanes. This also is the instrument shop test, but when conducted on board ship it is not conclusive as it requires the presumption that the terrestrial vanes are in adjustment. It is true that the vanes themselves are not so subject to derangement as the sun-mirror prism arrangement, but the test usually requires the dark mirror to be used and the latter is more subject to derangement than any other part of the circle. At an instrument shop the adjustment of the terrestrial vanes and the dark mirror can be checked and the subsequent sun-mirror check is then conclusive.

As very few officers are familiar with the procedure of adjusting an azimuth circle, a description of the method used at the instrument shop, Navy Yard, Mare Island, and at the Naval Observatory may be of interest.

On first reading, the description will appear to be very technical, but any reader who is sufficiently interested to break out an azimuth circle for reference while reading will find that the procedure is easily understood.

Special Appliances Required in Making the Adjustment

The appliances used in making the adjustment are a table, a plumb line, and a small, specially fitted telescope. The table consists of a composition disc about ⅜-inch thick with a diameter exactly fitting the inside of an azimuth circle. Two diametrical lines at right angles are scribed across the upper face of the disc. Near the outer ends of each line the disc is cut through over an area of about a square inch. Under these openings horizontal plates slightly larger than the openings are secured to small studs screwed into the bottom face of the disc. The distance from each plate to the upper face of the disc is the same as from the card to the upper face of the bezel ring on a Navy type 7½-inch magnetic compass. The top face of each plate is painted white and has a black index line which lies in the vertical plane through the diametrical line passing across the opening over it. The disc is fitted with a bubble level and is pivoted on a small stand equipped with four leveling screws and a clamp. The arrangement is very similar to that of a theodolite azimuth plate. The table can be used on any fairly level surface, but for convenience is mounted on a tripod.

The plumb line should be about six or

eight feet long and may be made of coarse black thread. It should be so hung as to have the sky or a well-lighted, white-painted surface behind it.

The telescope is a sextant star telescope equipped with a clamp bracket so installed as to be vertical to the optical axis and of such size that it can slip over the sun-mirror frame.

Examination and Repair Preliminary to Adjustment

A circle under repair is first critically inspected to determine that it is not bent or otherwise deformed. It is then examined to see if it "quarters" correctly. This is done by placing it on the disc and ascertaining that the 90°, 180°, and 270° marks (there is no 0 mark) register accurately with the diametrical lines. At the same time see if there is any sidewise shake on the disc. If the marks do not register properly, the center of the circle is not coincident with the center of the disc and correction must be made by an appropriate alteration to one or more of the wearing lugs secured on the inner circumference of the circle flange. If there is any shake, examine the spring clip to determine if there is the proper tension. If so, the trouble is worn lugs which will have to be renewed. While making the above inspection level the disc and see if the level on the circle is correct. If it is not in adjustment, insert the necessary shims to correct the error.

The fittings are then carefully inspected for dirt, corrosion, stripped screws, broken or foggy mirrors, badly chipped prisms, etc. Occasionally prisms are a trifle under size and do not fit the prism boxes neatly. Cases have been known where the defect was overcome by the use of removable shims. This is not good practice because when the prisms are removed on board ship for cleaning, the shims are liable to be lost or incorrectly replaced. It is best to discard such prisms. If they have to be used, the shims should be of metal soldered in place. Defective parts are renewed after all parts of the circle have been thoroughly cleaned. A complete overhauling at an instrument shop will include repainting the black parts if necessary. It is almost always necessary to replace the vane wire as very few circles come in with a properly stretched wire. This replacement is not difficult after the knack is acquired of getting the wire taut, but not so taut that it breaks when the screw is set up.

Dark mirrors are frequently broken or thrown out of adjustment. Carelessly slamming a pelorus or binnacle cover in place before folding the mirror out of the way is the most usual cause. To replace, take out the four screws in the frame cover. Several strips of paper packing usually will be found between the cover and the back of the mirror. Note their positions. When the new mirror is installed replace the packing strips as they formerly were located. If they are in bad condition replace with new ones made from paper of similar thickness. The use of these strips is an approximation only and may have to be altered as described later. In no case use strips of such thickness that undue pressure is necessary to draw the cover fully down all around.

The sun mirror usually is so foggy that replacement is necessary. This mirror is ground with a cylindrical surface of such radius that the reflected image of the sun strikes the face of the prism box as a vertical beam of approximately the same width as the slot in the box. Examine the new mirror to make sure it is silvered on the convex side; otherwise it will not serve its intended purpose. Take off the mirror frame cover and put the new mirror in place. Pack it along the edges and across the back so that it cannot shift in its mounting. Use strips of hard-surfaced paper. Blotting paper will not do as it tends to absorb moisture which will quickly deteriorate the silvering. Mirrors are seldom ground exactly alike and it is not advisable to substitute a new mirror on board ship unless there is some means of checking the adjustment. Put the cover in place and set down the screws. The cover must go home without undue pressure being required and yet have the mirror held firmly in place. If the mirror can shift even slightly the circle will be thrown out of adjustment for taking sun azimuths.

There are four fittings which pivot on horizontal axes: the sun mirror, the dark mirror, and the two terrestrial vanes. They must pivot with sufficient friction to remain in whatever position they are left when finger pressure is removed. It is very exasperating to use a circle with a floppy fit-

ting which requires one hand to hold it in place and it is next to impossible to use a circle with any degree of accuracy unless both hands are free to manipulate it in azimuth. The pivot screws screw into the movable fittings and turn in the mountings. With this method of securing, setting down on the screws has no effect on the tightness of the fittings and excessive pressure will only result in stripped screws or broken screw heads. To make the fittings pivot tightly, remove the screws and close the holes in the mountings slightly by squeezing lightly with pliers. On some circles the ends of the mountings are split as far as the holes, giving a spring grip as well as making it easier to close the holes when necessary.

After the foregoing has been done the circle is ready for adjustment.

ADJUSTMENT OF THE TERRESTRIAL VANES

Step 1.—Level the disc and place the circle on it. Turn the circle until the line of sight through the terrestrial vanes intersects a plumb line hung eight or ten feet away and set up the disc clamp. If the sight slot follows the plumb line, the rear vane is in a plane perpendicular to the plane of the circle. If the slot does not line up properly, bring the vane into adjustment by placing appropriate shims between its mounting and the circle. This vane is seldom found out of adjustment.

Step 2.—Prove in a similar manner whether or not the wire in the front vane is in the perpendicular plane and correct if necessary by means of shims between its prism-box mounting and the circle. This is seldom found necessary. It will be noted that the mount for the dark mirror and the front vane is apparently secured to its prism box by one small screw. In addition there are two dowel pins which cannot be seen unless the parts are disassembled. They keep the parts in alignment while the screw serves to hold the parts together. If the parts are disassembled for any reason, care must be exercised that the dowel pins are in place before reassembling.

Step 3.—Look through the rear-vane peep hole and move the dark mirror until the reflection of the 180° mark on the circle can be seen. The front-vane wire should line up with this reflection. If it does not, shift the mounting of the front vane about its vertical axis until the correction is made.

Step 4.—Line up the plumb line with the front-vane wire and the rear-vane peep hole. Move the dark mirror until the reflection of the front-vane wire can be seen. This reflection, the plumb line, and the wire itself should all closely coincide. If they do not it is necessary to adjust the dark mirror in its frame. This is done by taking off the frame cover and adjusting the paper packing strips until the required coincidence is obtained. Then recheck the 180° reflection (Step 3). It probably will be necessary to shift the front sight mounting to bring the 180° reflection and the wire together. Again check on the plumb line. There should not be much error, but if there is it can be reduced gradually by repeating both corrections as often as necessary.

Step 5.—Turn the circle on the disc until the 180° mark registers with one of the diametrical lines. Look through the rear-vane peep hole at the reflection in the front-vane prism. If the index line on the disc and the index wire of the circle do not coincide, shift the latter to the correct position. This step completes the adjustment of the terrestrial vanes.

ADJUSTMENT OF THE SUN MIRROR

Step 6.—Place the circle on the leveled disc and clamp the small telescope to the sun-mirror frame. Orient the circle in azimuth until the cross in the telescope coincides with the plumb line. Then revolve the mirror on its axis through an arc of about 45°. The cross should follow the plumb line. If it does not, it proves that the axis about which the mirror pivots is not parallel to the plane of the circle, i.e., one standard has been bent so it is not the same height as the other. The fault is remedied by bending one of the standards until the proper coincidence is obtained.

Step 7.—Try the side of the sun-prism box with a small square. If not vertical to the plane of the circle, correct by loosening the screws and moving the box on its vertical support. This adjustment is seldom necessary.

Step 8.—This step should be undertaken when the sun is visible and comparatively low. A strong electric light can be used with fair satisfaction, but the sun is so much better that it is advisable to wait for it if

necessary. Place the tripod and table in the sun. Level the disc and put the circle on it with the terrestial-prism index wire registering with one of the disc index lines. Use a shade glass to protect the eye and turn disc and circle together until the center of the sun is sighted through the terrestrial vanes. The dark-mirror reflection of the sun must usually be used as the sun seldom will be of sufficient strength to be of use in the sun mirror if low enough to be sighted directly through the terrestrial vanes. Clamp the disc and turn the circle clockwise on it until the terrestrial-prism index wire is in coincidence with the disc index line 90° from the one first used. With the sun mirror throw the reflected beam on the sun-prism box. If in adjustment, the beam will impinge directly on the slot and be reflected to the disc index line below it. The adjustment seldom will be correct on first trial. If the reflected beam strikes the slot at an angle, the fault is due to the mirror being badly shifted in its frame, mirror standards bent, a poorly ground mirror, or the prism box off perpendicular. The fault will have to be determined and corrected. If the beam strikes parallel to, but to one side of the slot, loosen the two screws which secure the sun-mirror mounting to the circle and adjust the mount until the beam enters the slot. Set up the screws lightly and repeat the observation with the terrestrial vanes and sun mirror, adjusting the mirror as necessary, until an absolute check is secured. Then set the screws up firmly and make a final check. As the sun is moving more or less rapidly in azimuth all the time, depending on the season of the year, the work described above must be performed with as little loss of time as possible between the observations by the two methods. If the reflected beam from the sun prism does not strike the disc index line radially, loosen the two screws which secure the sun-prism box to the circle and move the box slightly until the reflected beam and the index line are parallel. Set up the screws lightly. Then loosen the two screws which hold the prism box to its vertical support and move the box slightly until the index line is bisected by the reflected beam. It may be necessary to repeat these two operations several times until the final result is satisfactory. Then set up firmly all the screws involved. The adjustment of the sun mirror may have been affected by the prism adjustment. Its adjustment should be rechecked and readjustment made if found necessary. The above completes the adjustment of the sun mirror and the circle.

Testing and Adjusting With Ship's Facilities

The tests and adjustments described above can be made with a 7½-inch magnetic compass taking the place of the special table. The work must be done ashore with the compass blocked up so it is held in a level position. The fitting for a star telescope can be made on board ship. The procedure in principle will be the same as with the table. While the work is in progress due care must be exercised to prevent disturbance of the compass by movable magnetic material in the vicinity, especially on the person of the adjuster.

Approximate Tests

The dark mirror is not liable to shift in its frame if properly packed when assembled, but the frame may easily be bent or the whole mount be thrown out of alignment by misuse. If there is no reason to think that the frame is bent or the mirror itself is out of adjustment, the test of the reflected image of the 180° mark coinciding with the vane wire is proof of the terrestrial-vane adjustment.

A small straight-edge placed against the sides of the sun-prism box should intersect graduations on the opposite side of the circle equally distant from the 90° mark.

The perpendicularity of the fittings can be tested with a small machinist's square.

When viewed over the middle of the top of the sun-mirror prism box, the reflection of the slot should appear in the vertical center line of the sun mirror. When the mirror is rotated slightly the reflection should travel along the center line. If the mirror is symmetrically ground this is an almost absolute test when made by one having an accurate eye; otherwise a considerable element of personal error will affect the result. If in doubt as to the accuracy of the estimate, lay off the center line of the mirror and mark it with water paint or soap and improvise a peep hole over the center of the prism box. Unfortunately many mirrors are not perfect and the test

in such cases is only an approximation. When a circle has been placed in adjustment, it is well to make the above test and record the result. As long as the same mirror remains installed, subsequent tests can be checked against the recorded data and will be of value.

HINTS ON THE USE OF THE CIRCLE

A little lubrication on the edge of the compass or repeater will make an azimuth circle turn smoothly.

At night, bearings of distant objects or lights cannot be taken with the degree of accuracy that is possible with day-time observations, especially when a light with a short period of illumination is being observed. It is very difficult to get any result when the slot or peep hole in the rear vane is used as a great number of the already limited rays of light are cut off. Nor can the vane wire be seen unless considerable illumination is used. This illumination interferes with the observation. Equally good, or at least sufficiently good, and much more rapid results can be obtained by sighting over the vanes. It is a great help to turn the front vane in slightly so its top can be seen when only dim illumination of the compass or repeater is used.

Accurate azimuths of the sun when the ship is rolling or pitching are rather difficult for the novice. Practice develops skill and it is wise to get the knack before sometime being unexpectedly required to show expertness. The higher the sun the more difficult it is to obtain an accurate observation, as slight errors in holding the compass level have a greater effect.

Formerly it was the practice to equip storage boxes for circles with wooden blocks recessed to hold one or more of the fittings. These are being removed when received at an instrument shop for overhaul, as it has been found there is danger of the fittings being forced out of position when a circle is carelessly placed in a box so fitted. In their place two blocks are installed to grip the outside of the circle. Each block has a pivoted wooden button to clamp the circle.

When using a circle, do not turn it by exerting pressure on any of the fittings other than the three studs provided for the purpose.

Keep circles clean and do not let them get wet if it can be avoided. All dampness should be dried off as soon as possible. If corrosion is allowed to progress unchecked it will be difficult to take the prisms out for cleaning.

Do not allow any parts except the prisms to be disassembled for cleaning. Should other cleaning or adjustment be required on board ship, the person undertaking it should do so with full knowledge of the difficulties involved.

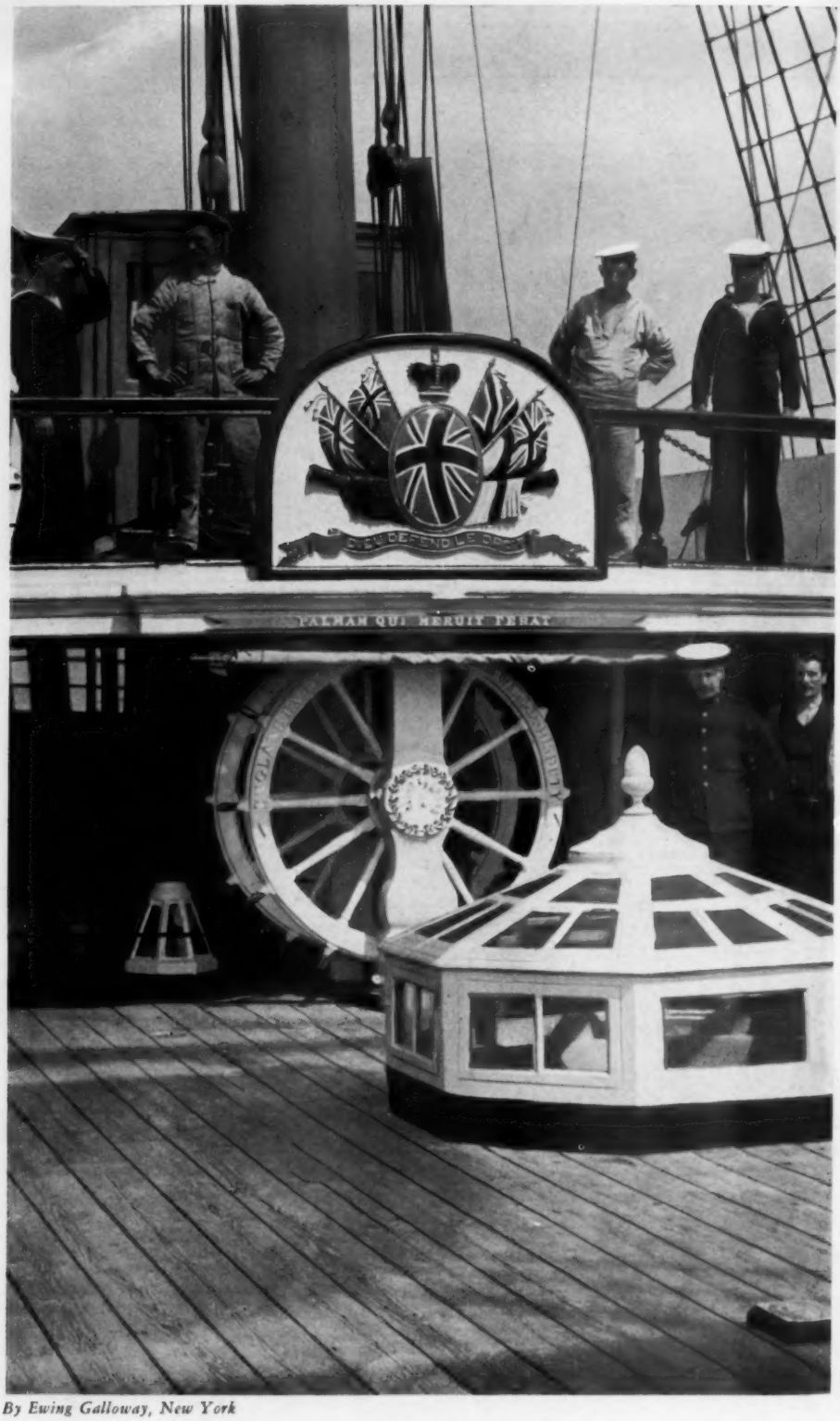
Remember that the fittings are secured in place by the clamping effect of light screw heads and are easily knocked out of adjustment if the circle is not handled carefully. The fine threads of the screws are easily stripped if undue pressure is used. Should occasion arise to make repairs on a circle, use screw drivers which fit the slots in the screw heads.

Different classes of ships have different numbers of circles allowed them. When the allowance is large enough to permit doing so, one circle known to be in perfect adjustment should be locked up and only used as a standard of comparison for the other circles. Defective circles can be very easily brought in adjustment if a standard is available. On every ship the navigator should reserve one circle for sun azimuths exclusively and permit no other person to handle it. If in adjustment originally, this careful use should preserve it unchanged.

By Ewing Galloway, New York

NELSON'S FLAGSHIP *VICTORY*, PORTSMOUTH HARBOR, ENGLAND

Queen of the fleet that defeated the combined French and Spanish Navies at Trafalgar, October 21, 1805. Nelson was killed on the deck of the *Victory* in this, the biggest naval battle ever fought between sailing ships.



By Ewing Galloway, New York

TABLET ON DECK OF THE *VICTORY* MARKS THE SPOT WHERE NELSON, THE GREAT BRITISH NAVAL HERO, FELL

The old ship is well preserved. The ship's historical importance is even greater to English people than the *Constitution* is to Americans. The Battle of Trafalgar was the greatest naval battle up to the beginning of the nineteenth century.

International Newsreel

H.M.S. *NELSON*

England's most modern battleship, named for Lord Nelson. Dressed for review.

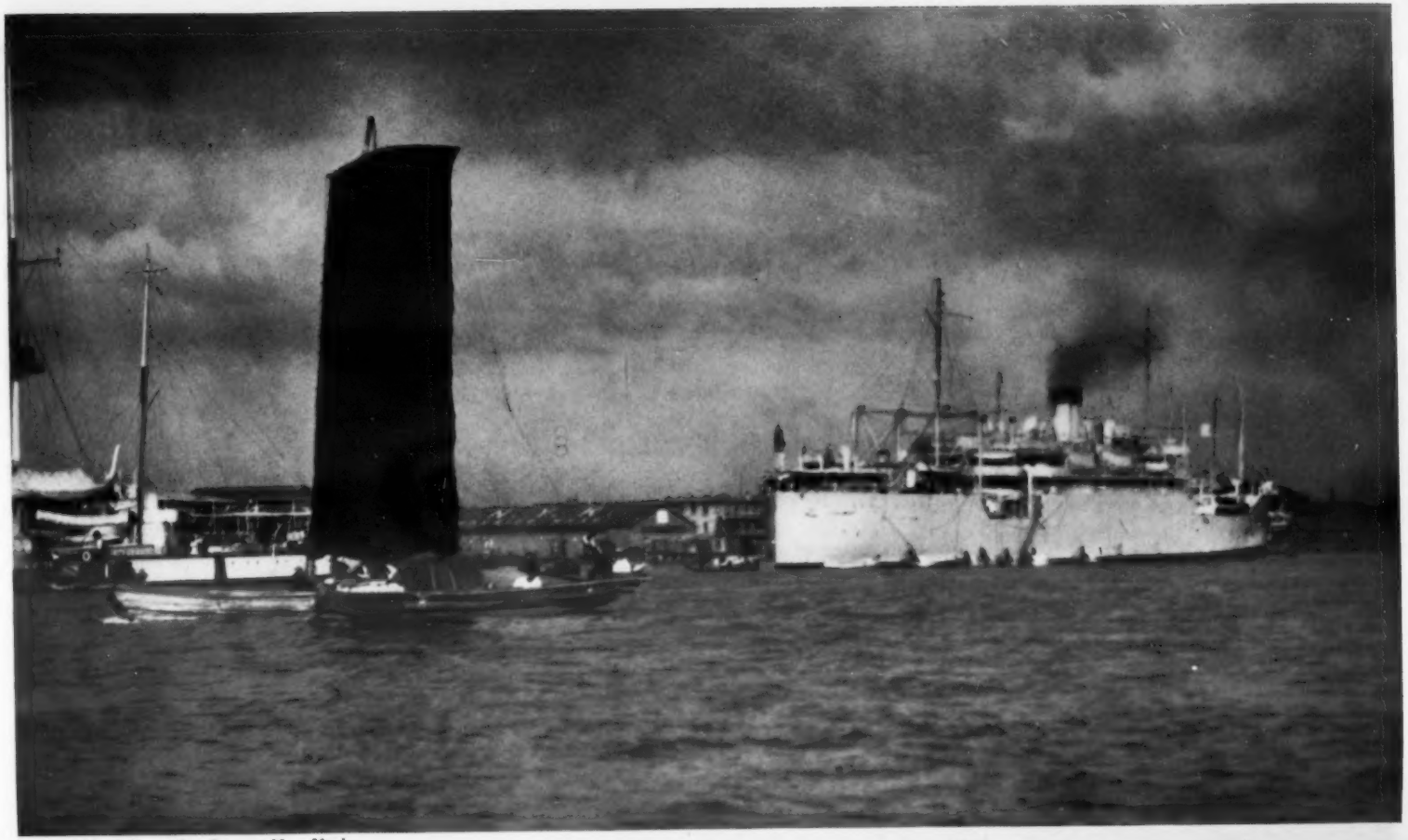
Courtesy Navy Recruiting Bureau, New York

U.S.S. *PAUL JONES* AT ZAMBOANGA

Courtesy Navy Recruiting Bureau, New York

BOATS FROM THE *MEMPHIS*, *PITTSBURGH*, AND *MACLEISH*

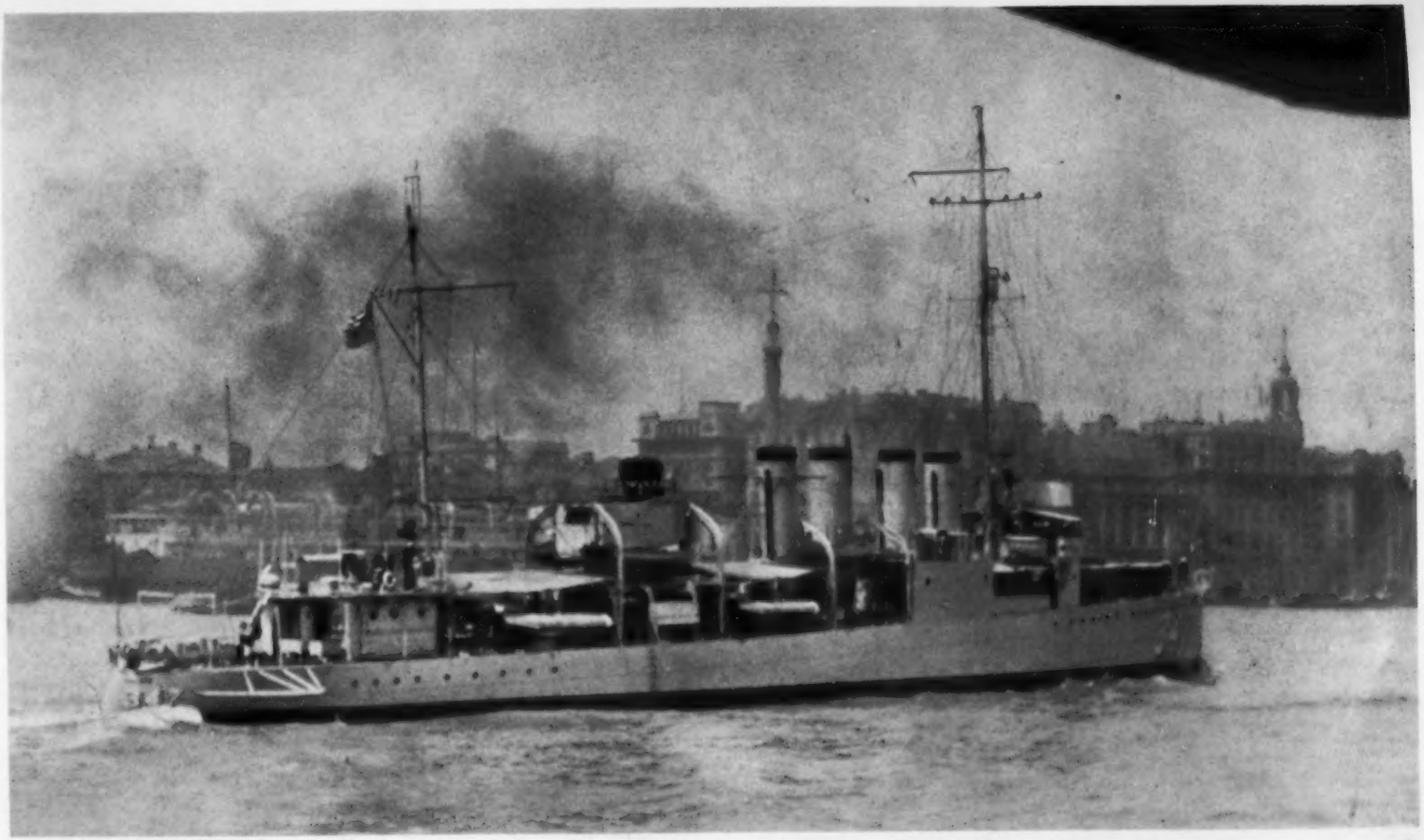
Underway in the free-for-all sailing race, held by U. S. Asiatic Fleet, passing a Chinese junk.



Courtesy Navy Recruiting Bureau, New York

CHINESE JUNK PASSING U.S.S. *CHAUMONT* AT SHANGHAI
In the Whangpoo River.

CHINESE JUNK PASSING U.S.S. *CHAUMONT* AT SHANGHAI
In the Whangpoo River.



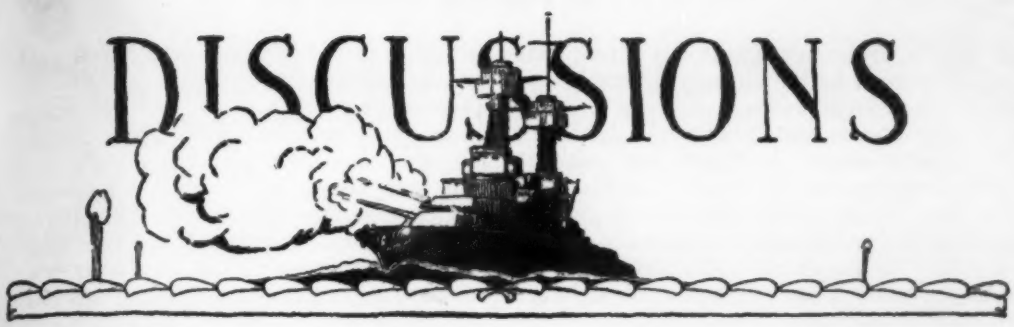
Courtesy Navy Recruiting Bureau, New York

U.S.S. *PRUITT* LEAVING SHANGHAI FOR YOKOHAMA

Courtesy Navy Recruiting Bureau, New York

NAVAL COMMUNICATION SYSTEM AT WORK IN THE ORIENT

DISCUSSIONS



The Line Task: Command

(See page 296, April, 1929, PROCEEDINGS)

LIEUTENANT C. G. MOORE, *U. S. Navy.*—In Lieutenant Commander Tawresey's excellent article on the art of command in the April PROCEEDINGS, he struck a note which in my opinion is so timely and appropriate that I feel constrained to elaborate somewhat my own views on the subject. I refer to his repeated reference to the important part that general education plays in the career of a line officer and to the author's questioning attitude on the problem of promotion examinations.

The question of specialization versus generalization is an old one, but like Lieutenant Commander Tawresey, I believe that the Department has acted wisely in restricting the technical specialists of the Navy to a minimum.

Since specialization is not a policy of the Navy and since it is incumbent upon all line officers to have working knowledge of each of the manifold branches of their profession, I believe that a great deal could be done in furthering this policy by the Department's making greater use of and amplifying the facilities now available for accomplishing this valuable end.

I have never met an individual who admitted that he was equally familiar with all phases of the possible duties which as a line officer he might be called upon to perform, or who was equally proficient in all the arts of his profession. With each new invention that is applied to naval science, there is another "gadget" for the candidate for promotion to become familiar with. Already the time has arrived when a line officer is required to be a potential "jack of all trades," and if we are to avoid his becoming a master of none, a clear, definite policy of higher and continued education for the line officer seems compelling and inevitable.

It is appreciated that certain steps have been taken in recent years which indicate that the Department is fully awake to the necessity of affording the officers greater opportunities for familiarity with their increasingly complex duties. The inception of the War College correspondence course and the establishment of the line-officer course have been and will continue to be of great value to the younger members of the service. But the latter course is only available to a limited number of officers annually. It may in time become available but physical limitations at present preclude it now being mandatory in the education of junior officers.

Aside from this recently founded school and the one correspondence course which the Navy has to offer, what other facilities open to all are afforded the line officer to perfect himself in the intricacies of his special duties and the acquisition of that broad liberal education which should be his goal and aspiration? Rotation of duty, adequate ship's libraries, Bureau of Navigation Loan Library, and the individual's own efforts and study.

As rotation of duty is dependent upon many contingencies that cannot always be foreseen and provided for, and as libraries are passive and latent sources not always inviting nor easily accessible, the individual officer must depend largely upon his own initiative and effort to fill the gaps in his education in order to be prepared at all times to exercise the art of command in whatever field of naval activity a long and varied career may lead him. If he is not to be a hopeless academician, spending all his spare moments in the pursuit and acquisition of facts, or else a slothful fatalist engaged in furious cramming once in a decade to make

NAVAL COMMUNICATION SYSTEM AT WORK IN THE ORIENT
Courtesy Navy Recruiting Bureau, New York

the hurdle to the next grade, his educational activities must be intelligently directed, systematic and progressive.

It seems to me that in respect to this latter the Department can do a great deal, without restricting personal initiative, in helping the individual to approach the desired goal of professional excellence, as originally defined by John Paul Jones and today augmented by a century and a half of technical and mechanical development.

Therefore, I submit the following suggestions as possible aids:

(1) That the Bureau of Navigation lay down and disseminate to the service at large as a guide to all officers the *minimum* technical knowledge that is required in each scientific and special branch for individuals performing general line duties, and that it indicate the sources and publications from which such information can readily be obtained; and that wherever practicable these be incorporated in specially prepared correspondence courses and departmental publications. These should be general rather than detailed in scope and the examining board should adhere to these standards in compiling examinations for promotion.

(2) That the doctrine of rotation of duty for professional advancement be supplemented by requiring the officer detailed for a certain duty to show greater knowledge than is generally required of others for that subject; and that where considered advisable and applicable he be required to increase his proficiency in performance and knowledge of the subject by further study in a prepared postgraduate correspondence course.

(3) That wherever an officer has completed successfully a tour of duty in a specialized subject as navigation, engineering, communications, etc., while in a certain grade he be deemed proficient in this subject, an appropriate entry be made on his record, and he be excused from requalifying upon it on his next examination for promotion.

(4) That effort be made towards increasing the facilities of the War College and line-officer course to the point where every officer who so aspires may be given the opportunity to take *both* these courses *in addition* to any technical postgraduate instruction his record and proficiency may warrant and that he may request.

(5) That an officer after he has spent ten years in one grade be encouraged and permitted to qualify for the next higher grade by being afforded every opportunity for frequent short courses of one year's instruction on shore alternated by similar periods at sea. An officer who has spent ten years in a certain rank should have reached his highest efficiency in that particular rank. He will probably be no better if as good after twelve years in the duties of that particular grade. It seems imperative in a period of promotion stagnation such as we are now facing that the officer who has recently been promoted to a grade be given early opportunity to demonstrate his efficiency therein. There are only so many ships; on each only so many officers of a certain rank can be satisfactorily and efficiently employed. Many officers, now at sea, holding assignments similar to those held ten years ago by them, could, I believe, be just as effectively and advantageously developed, undergoing special training and study, and at the same time give opportunities to others to hold billets to which their rank and experience entitle them. It is a well recognized fact that sea billets are scarce. Aside from increasing the number of ships which is not within the power of the Department, a solution offers itself in the further training and instruction of officers.

(6) That wherever due to the exigencies of the service an officer is not afforded an opportunity for performing certain duties of a technical nature as engineering, electricity, etc., he be permitted to qualify by taking a course of study and upon satisfactorily qualifying, as demonstrated by examination or to the satisfaction of his superiors, be given a credit in this subject and as in (3) above, he be not required to requalify upon his examination for promotion. This would seem a desirable provision in certain instances where through no fault of the individual his duties have not been sufficiently varied in a certain grade to round out his career in that rank. Jobs are definitely limited; the opportunity to qualify for them should not be, and *some incentive* should be offered the prospective aspirant. Furthermore it would encourage officers to familiarize themselves with other important branches of their profession which might otherwise be neglected by absorption in their restricted specialty or particular duties.

(7) That a limited number of especially deserving officers after a certain number of

years' service afloat in grade and on becoming eligible for shore duty be permitted to take courses in liberal arts at specially designated civilian colleges as a regular tour ashore. It is not necessary to point out the practical advantage that would accrue to the individual officer, the service, or to the public at large by such a procedure. A small group of such officers would return to the service bringing with them a broader outlook and a greater vision of our national ideals and aims and should establish more sympathetic understanding between our Navy and the nation. To what extent has the Navy taken advantage of the splendid course in international law and diplomacy that is given each summer in one of the large eastern universities?

(8) That future examinations for promotion in all grades be more general, emphasizing guiding principles rather than details. Principles are permanent, unchanging, important. Detailed knowledge may be valuable today and rendered practically obsolete and useless tomorrow by mechanical evolution, progress, and invention. It must be apparent that in a large and highly complicated organization such as the Navy it is impossible to carry over a long period in one's head all the details, steps, methods, and data such as one frequently encounters on current promotion examinations. These details are conveniently collected in bureau manuals available to all officers working with the mechanism, which would indicate that officers are neither required nor expected to carry this vast material within the brain. No conscientious officer will prepare a torpedo for firing without consulting an *Ordnance Manual* or a board upon which the various steps are posted. No newly appointed engineer officer performing duties below for the first time would prepare his department for getting underway without carefully consulting his ever growing *Manual of Engineering Instructions*, his ship's records, and his technical assistants.

(9) That instead future examinations for promotion in all grades be prepared with reference to the broad education referred to in Lieutenant Commander Tawresey's article; and that officers be required to show a general knowledge of the policies of their own and foreign countries, questions of international import, the causes of friction between nations and the significance of treaties, alliances, and other international commitments. That greater emphasis be placed on liberal education and cultural attainments; less on the narrow channels of specialization.

How is the challenged naval officer to reply to the ulterior-motived but liberally educated "internationalist" unless he is familiar with the subtle persuasive weapons of the latter? How many officers in the lower grades read regularly the annual report of the Secretary of the Navy, the confidential reports of the commander in chief on fleet problems and tactical exercises, monthly information bulletins of O.N.I., reports of the Military Intelligence Division of the War Department General Staff, and the Fleet Training publications? To how many are they available and easily accessible? Which is more important, knowledge to the individual—the detailed method of starting up a pump which may be replaced by a totally different design tomorrow or the general principles of administration and applied tactics that may be found in the above-mentioned publications? Which is the more important asset to the line officer fitting himself for the important duties of command and who is daily thrown in contact with human beings that he must lead—a working knowledge of the principles of psychology as expounded by William James or some other acceptable authority or the ability to construct a Zeuner valve diagram? We like to theorize on the vastly greater relative importance of handling personnel over that of handling mere material. When periodically requiring an officer to demonstrate his ability for the next higher rank upon examination do we then give the preponderance of weight to those spiritual qualities of leadership or do we resort to quizzing the candidate upon technical and relatively insignificant details?

(10) That while insisting that all line officers have a general knowledge of naval science as a whole the Department encourage special study and research work and that stimulation be given to the individual effort by proper encouragement and *adequate recognition.*

There is nothing new in the above; much of it may be impracticable. But in the hope that some of it may be worthy of consideration it is submitted as a possible solution to the ever growing problem of how the officers of our Navy, while still keeping abreast of the increasingly rapid development of naval

science, may retain that broad outlook on matters of world-wide scope and interest for which they have always been justly famed.

If the hope of reward is the successful stimulus to human endeavor that it is reputed to be, would not some concrete and practical recognition by the Department, such as credits for professional attainments, encourage the ambitious and stir the slothful to systematic and progressive effort rather than to spasmodic "cramming" at long intervals followed by later periods of comparative inaction and stagnation? Why are all the courses prepared by the Bureau of Navigation for the enlisted man? Has the officer nothing further to learn except from experience?

Some Hows and Whys of Electric Meter Calibration

(See Page 118, February, 1929, PROCEEDINGS.)

LIEUTENANT W. J. HOLMES, *U. S. Navy.*—Anyone using Lieutenant Perry's method of calibrating electric instruments should do so with a full understanding of the errors to be encountered by such a calibration.

The method of calibration of the high-potential meter is correct and no great difficulty should be encountered in such a calibration. The calibration of the low-potential voltmeter and the millivoltmeter will be subject to an error the magnitude of which depends upon the resistances of the meters.

Thus with the resistances given and with an EMF of 120 volts supplied, the current flowing in the system will be around 0.5 ampere. Let us assume that the sum of the resistances is exactly 210 ohms and voltage impressed is 105 volts and exactly 0.5 amperes flows. This current will be indicated by the measurement of the IR drop in a portion of the circuit as described. If the voltmeter to be calibrated is the usual voltmeter of three volts range, to get maximum deflection it must be placed across a resistance of 3÷0.5 or 6.0 ohms or 600 centimeters of the nichrome slide wire. Now the resistance of the usual 3-volt voltmeter is about 250 ohms and as soon as this instrument is placed across the 6-ohm resistance of the slide wire, the resistance of the circuit is no longer 210 ohms but becomes

$$210-6+\frac{1}{\frac{1}{6}+\frac{1}{250}}=209.89$$

The current now flowing in the system as a whole will be

105÷209.89 or 0.502 amperes.

Then the current flowing through the portion of the resistance across which the voltmeter has been placed in parallel will be

0.502—3/250 or 0.490 amperes.

The percentage of error in this case will then be

$(0.5-0.490)/0.5\times 100=2\%$.

This error will be proportionately smaller for less than full scale reading.

In calibrating the millivoltmeter the same error will be encountered. In this case, however, the usual resistance of a 50-millivolt voltmeter is about 2 ohms or 40 ohms per volt as against 250/3 or 83 ohms per volt in the case of the voltmeter. Thus the percentage error will lie between 4 per cent and 5 per cent at full scale. This error is not inappreciable.

The calibration of the ammeter by the millivolts drop across its own shunt is open to the further objection that the shunt is not being calibrated. While it is true that the shunts are so protected that they are not liable to become nicked or otherwise damaged in such a manner as to change their resistances, still such a possibility must be kept in mind. The instrument is being checked only as a millivoltmeter, not as an ammeter.

The low-potential voltmeter might be checked in the same manner as the high-potential voltmeter by removing R_1 and R_2 from the circuit and using two storage cells as the source E. The millivoltmeter might be checked in a similar manner in the same position by using a known resistance in series with it as a multiplier, the resistance of the meter being also known.

In general it is felt that the navy yard can usually do a much better job of meter calibration than can be done with the facilities aboard ship. However, two years of experience under the conditions now being met by Lieutenant Perry easily convinces one that meter calibration aboard ship is sometimes more than justified.

PROFESSIONAL NOTES

2 JULY TO 1 AUGUST

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LIEUTENANT COMMANDER D. C. RAMSEY, U. S. NAVY
AND
PROFESSOR HENRY BLUESTONE, U. S. NAVAL ACADEMY

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UNITED STATES

Text of President Hoover's Reply to Premier MacDonald Announcing Delay in Our Cruiser Building

The New York Times.—Washington, July 24.—President Hoover, in his pronouncement of the American position, in reply to Premier MacDonald's statement on naval disarmament in the House of Commons at London today, said:

I have read with real satisfaction the statement which the Prime Minister has made in the House of Commons. The American people are greatly complimented by his proposed visit and he will find a universal welcome.

Mr. MacDonald's statement marks a new departure in discussion of naval disarmament. The Prime Minister introduces the principle of parity which we have now adopted, and its consummation means that Great Britain and the United States henceforth are not to compete in armament as potential opponents but to coöperate as friends in the reduction of it.

The Prime Minister has stated clearly and unmistakably the principle on which he is acting. I cannot but be responsive to the generous terms in which he has spoken of the attitude and purpose of the United States. We join in his efforts in the same spirit.

Mr. MacDonald has indicated the good-will and positive intention of the British Government by suspension of construction of certain portions of this year's British naval program.

It is the desire of the United States to show equal good-will in our approach to the problem.

We have three cruisers in this year's construction program which have been undertaken in the government navy yards, the detailed drawings for which are now in course of preparation. The actual keels would, in the ordinary course, be laid down some time this fall. Generally speaking, the British cruiser strength considerably exceeds American strength at the present time and the actual construction of these three cruisers would not be likely in themselves to produce inequality in the final result.

We do not wish, however, to have any misunderstanding of our actions, and therefore, we shall not lay these keels until there has been an opportunity for full consideration of their effect upon the final agreement for parity which we expect to reach, although our hopes of relief from construction lie more largely in the latter years of the program under the law of 1928.

Our Naval Building Program

By Thomas G. Frothingham, Captain, U.S.R.—Boston *Herald.*—The naval situation and the question of naval building programs must be recognized as very important at this time, both here and abroad. Especially of late, there has been so much haphazard discussion in the press that the actual state of affairs has been obscured. The result has been the creation of an illusion, utterly vague and lacking in reality but still persistent, that the United States is planning an expansion of its navy. There is no foundation for this fiction—and no rhyme nor reason for its exploitation.

On the contrary, every American can take pride in the record of the United States as the strongest influence in the world for the limitation of armed forces. We must never forget the one fundamental fact that underlies the whole present naval situation. At the Washington disarmament conference of 1921, the United States voluntarily relinquished an assured naval superiority. Europeans forget this. But the euphemistic statement, that "the United States was conceded an equality," or "parity," which has been used abroad so frequently, is the reverse of the truth.

American Superiority

This American naval superiority, which unquestionably existed at the time of the conference in 1921, was the result of an unusual sequence of events. Before we entered the World War, its object lessons had taught our nation the need of a strong naval defense. Public opinion had been aroused, and, in response, Congress adopted the building program of 1916. This was a far reaching scheme of warship construction for the United States Navy, to be completed in 1923-1924. Its main feature, and the thing that made it efficient to an extraordinary degree, was an increased construction of battleships, of which the designs were the product of the doctrines consistently developed by the United States Navy.

Our navy had been steadfast in its policy that a battleship, inherently, must be a strongly protected mobile platform for mounting heavy guns. Our navy had always maintained the doctrine that the gun wins results in action—and that doctrine has been confirmed by all the lessons of the World War. For this reason, American construction of battleships has been astonishingly sound, and has insured to its output a longer life of usefulness. Consequently, the building program of 1916 was giving to the United States Navy the main element of naval strength to an extent that was not appreciated by the world. This increase of

strength was all the more marked, because, at the very time the United States was gaining strength in the main essential, the other navies were being led astray by prevailing fashions in naval construction, which produced only weakness.

The British Craze

This was especially true of the British navy, because it was dominated by the craze for battle cruisers. Under the influence of this obsession, the British navy even abandoned the construction of battleships, in favor of types of the *Renown* and *Hood*, which are very vulnerable. The result was, the United States navy was gaining battleships, and the British navy was actually failing to add any battleships. As the inevitable consequence of this mistaken policy, the British, in 1920, suddenly discovered that the United States was assured of possessing the strongest battle fleet in the world. There was no possibility for the British to catch up, as modern battleships cannot be hastily improvised. The sudden realization of this overwhelming naval superiority of the United States was a great shock abroad—and there was an outburst of discussion in the press. At the time Europeans were convinced that the United States cherished imperialistic aims. All manner of hidden objects were assigned to us—more mysterious to us than to anyone else! Americans realize how utterly indifferent our nation is to "foreign policies," which have been the breath of European nostrils. But it was only natural that Europeans should judge us by their own lights. As we all know, our nation had no ulterior designs whatever. Defense had been our only object. Moreover, included in the building program of 1916 was a provision for stopping warship construction, if it should be made possible by international agreement.

Europeans believed this last was a dead letter—and it is difficult to imagine any foreign power giving up any such advantage. But the United States did not delay in proving that this was in good faith. At the first session of the Washington disarmament conference, in 1921, the United States astonished the world by proposing that the superior American battle fleet should be put on an equality with the British battle fleet. The whole question was thus settled at once by this act of the United States. It meant, on the part of the United States, that a great deal of the most modern construction of the 1916 program was scrapped, and an agreement was made by which the battle fleet of the United States, Great Britain, and Japan, were fixed for ten years in proportion of five, five, and three, respectively.

A Bad Feeling

We cannot exaggerate the beneficial effects of the Washington conference upon the world at large. It is true that a break between the United States and Great Britain is inconceivable. And the amity between the two nations is the one great prop of the world. It is also true that the United States has no aims of aggrandizement in any direction. But there would have been a period of harmful suspicion and jealous competition, if this renunciation of our naval superiority had not been thus accomplished. The years have proved that the Washington conference has been the most important influence for peace and good will since the World War.

We must keep in mind that this act of the United States definitely settled the question of the status of the actual fighting forces of the different navies. The issues of today relate only to the auxiliaries of the battle fleets. This is the point that has been missed, and it cannot be emphasized too strongly, because too many people have the idea that it is now a question of "arming" the United States.

On the contrary, it is solely a question of providing auxiliaries that will keep our battle fleet in the justly balanced position decreed by the Washington conference. We must no longer think of a battle fleet in the old terms. A modern fleet needs a great number of attendant craft, as its screen must be flung over wide areas of ocean. It must have cruisers, destroyers, submarines, aircraft, in addition to the great number of attendant craft for supplies and maintenance.

All these, in ultimate service, must be considered auxiliaries of the fleet. Our people are beginning to realize this in the case of aircraft. In spite of all developments, the analogy is that of birds which have the most perfect flying mechanism, yet have to come to the surface of the land or water to exist. Like them, aircraft must find subsistence on the surface. This means that they must be transported as auxiliaries. They cannot fly

off alone. Consequently, a modern fleet carries great numbers of planes, not only in aircraft carriers, but in the fighting ships themselves. The fanciful pictures of planes attacking and destroying a battle fleet must be put aside. Any air attack directed against a fleet would meet the opposition of the swarm of planes carried by that fleet, and the lessons of the World War have shown that airplanes neutralize one another.

WHY WE WERE SLOW

It is the question of providing cruisers which has become urgent. Evidently, the beneficial effect of the balance of armed forces, established by the Washington conference, would be impaired if the United States were to remain handicapped by an inferiority in cruisers. We have been slow in building cruisers because we feel that there would be a further agreement for the limitation of these principal auxiliaries of the battle fleets. This was the object of the call for the Geneva conference of 1927. As our naval defense must cover great expanses of ocean, the preference of the United States Navy has been for the full limit of 10,000 tons decreed by the Washington conference. The chosen policy of the British navy has been to patrol many local areas with a larger number of small cruisers. However, it seemed probable that these two aims might be reconciled on a common sense basis of limitation.

But the British representatives, Cecil and Bridgeman, came to Geneva under instructions to insist upon a greatly increased tonnage of cruisers, and the Geneva conference perished at its birth. As a natural result, our Secretary of the Navy brought forward an enlarged program. But, in Great Britain, there was at once a strong revulsion against the excessive tonnage of cruisers proposed by the British representatives at Geneva. This revolt was actually led by one of these representatives. On his return from Geneva, Cecil resigned from the British cabinet with the explicit statement: "I was out of sympathy with the instructions received." And it became so evident that British public opinion would veto the enlarged program for cruisers that our naval committee in Congress was able to discard the large program and to substitute the most moderate program for the United States Navy which is in the pending naval bill.

NOT EXCESSIVE

Instead of any excessive demands, this only provides for laying down cruisers, five in 1930, five in 1931, five in 1932, to be completed within six years. The disclosure of the so-called Anglo-French pact called forth more discussion, for it seemed to indicate that the British continued to insist upon their enlarged cruiser program. But, again, the reaction of British public opinion has been so emphatic against it that there is evidently a second and final veto of the excessive tonnage of cruisers. In America the response has been again immediate, and the President's message did not ask for the addition of a ton to the cruiser program of the naval bill. He even proposed "the elimination of the time limit" for the building of the cruisers.

All this has been a triumph for the good sense of public opinion in the United States and in Great Britain. It is only necessary for our people to understand this, and to forget the useless verbiage which has covered the truth. One most significant clause in the pending naval bill should be learned by heart. "In case of an international agreement . . . the President is hereby authorized and empowered to suspend, in whole or in part, any of the naval construction authorized under this act."

This means that we are again acting in the full spirit of the Washington conference. This is an actual pledge such as we made before, and which brought such good results for peace. Our public must grasp this reality, and not be turned aside by fictions.

GREAT BRITAIN

H 47 Sunk

Engineering, July.—For the fifth time since the war the nation has to lament the loss of a British submarine and the heavy deathroll which is the invariable concomitant of these tragedies. On Tuesday morning, July 9, the *H 47*, of the Sixth Submarine Flotilla, while exercising in the Irish Sea with other craft of her type, came into collision with *L 12* in a position about twenty miles due west from Fishguard, and apparently sank immediately. The commanding officer, Lieutenant R. J. Gardner, R.N., a telegraphist petty officer, and a stoker petty officer were saved, but the other members of the crew, twenty-one in number, perished.

Two of the crew of *L 12* are missing and one has died from injuries. The lost boat, which was built at Dalmuir in 1918, belonged to a large class of small submarines constructed under the war program. She displaced 440 tons on the surface, was 170 feet in length, and had oil engines of 240 B.H.P. As a class the "H" boats proved very successful and have always been popular with the navy. Each year since the war, except 1928, there have been accidents to British submarines, generally with loss of life more or less severe. The *K 5*, *H 42*, *L 24*, and *M 1* foundered with all hands. Abroad there has been an even larger crop of such peace-time casualties, notably the American boats *S 51* and *S 4*, two large Japanese submarines, the Italian *Veneiro* and *F 14*, and the French *Ondine*. As early as Tuesday afternoon it was officially announced that all hope of rescuing the men imprisoned in *H 47* must be abandoned. As the vessel lies in fifty fathoms it is doubtful whether she will ever be brought back to the surface.

Naval Mission To Be Sent to China

London *Times*, July 7.—Shanghai, July 1.—It is announced from Nanking that a Chinese-British naval agreement was signed by Sir Miles Lampson, the British Minister, before he left. This news is satisfactory as indicating another step towards the restoration of the former friendly relations between the two countries.

A British naval mission will come to China for the purpose of giving instruction in naval matters and assisting the Chinese in developing their own navy. A batch of Chinese naval cadets will proceed to England and serve for a period in British war vessels with the view of gaining modern naval experience. The Chinese are eager to increase the size of their fleet, and, it is understood, contemplate giving orders for warships in England.

Nearly forty years ago a British naval mission arrived in China for a similar purpose, and since then many young Chinese have served in the British navy, some of whom have been distinguishing themselves in naval operations in the recent campaign against Wuhan.

The information contained in our correspondent's message is confirmed by a communication issued last night by the Foreign Office, which, after announcing the signing of the agreement, says:—"It is understood that the Chinese Government have a comprehensive program for the building of a substantial navy, and it is their intention to have some vessels constructed in Great Britain."

Launchings

SUBMARINES

Navy and Military Record, June 16.—Two of Britain's latest and most modern submarines were launched during the week-end—the *Parthian* at Chatham Dockyard on Saturday, and the *Poseidon* at the Naval Construction Works of Messrs. Vickers-Armstrongs, Ltd., at Barrow-in-Furnace, on Saturday.

The new underwater craft are two of the six submarines of the "P" class now being built. One, the *Perseus*, had already been launched from the Barrow yard. Each of the "P" type carry a four-inch gun and eight torpedo tubes. The *Parthian* is the twenty-ninth submarine to be built at Chatham since 1908, and the *Poseidon* is the one hundred and fifty-fourth submarine to be launched from the Barrow yard.

FLOTILLA LEADERS

London *Times*, July 11.—H.M.S. *Codrington* is to be launched at the works of Messrs. Swan, Hunter, and Wigham Richardson, Limited, Wallsend-on-Tyne, on August 8. This is the first flotilla leader to be built for the Royal Navy since the War. The last vessels of the type were the *Broke* and *Keppel*, which were laid down in 1918, but were not completed until some time after peace was signed. It is now a settled practice to name ships of this type after admirals of lesser distinction than those, like Nelson and Rodney, after whom battleships are called. The *Codrington* is designed for thirty-five knots, or one knot less than her predecessors, but will have eight instead of six torpedo tubes.

CRUISERS

London *Times*, July 12.—At Devonport Dockyard today there is to be launched the cruiser *Exeter*, the only ship of her class authorized in the Navy estimates of 1927. Originally three cruisers were included in the program for that year, but in the light of the situation disclosed at the Geneva Naval Conference the Government reduced

the number to one, the ship now being put afloat.

The *Exeter* is the second of the medium-sized cruisers of what are known as the "B" type, with a displacement of 8,400 tons instead of the 10,000 tons of the ordinary post-Washington cruisers. These smaller ships cost about £1,750,000 each, a reduction of nearly £500,000 on the larger vessels. They are being given the names of cathedral cities, and the first, H.M.S. *York*, which was launched by the Duchess of York a year ago, is due for completion next March. Designed by Sir William J. Berry, Director of Naval Construction, the keel of the *Exeter* was laid on August 1, 1928, so that she has been brought to the launching stage within twelve months. The length of the class is 540 feet, as compared with 595 feet in the larger "A" class; and the breadth 57 feet, as against 66 feet. The main draught of water at standard displacement, however, is the same (17 feet). Geared turbines, which in the case of the *Exeter* are being manufactured by the Parsons Marine Steam Turbine Company, will develop an estimated horsepower on trial of 80,000, which is the same as in the "A" class, but it is expected that the corresponding speed will be somewhat higher than the thirty-two and a quarter knots of the latter ships. The oil fuel capacity, on the other hand, has had to be cut down in the smaller ships, which will have accommodations for 1,900 tons, as compared with 3,200 tons.

Similarly, they will not be so heavily armed with 8-inch guns, carrying six of these weapons mounted in three twin turrets, two forward and one aft, instead of eight guns in four twin turrets, two forward and two aft.

Navy Flying Practice

London *Times*, July 17.—This morning destroyers of the Atlantic Fleet were patrolling an area about twenty miles south-south-east of St. Catherine's, Isle of Wight to warn passing ships that the *Nelson*, flagship of the Atlantic Fleet, and the minelaying cruiser *Adventure* would be carrying out firing in the vicinity, at the wireless-controlled target vessel *Centurion*. The official spectators and those press correspondents permitted to watch the shoot embarked in the destroyer *Versatile*, at Portsmouth at 3:30 yesterday afternoon and were taken to Sandown Bay, where official visitors were transferred to the *Nelson*, the correspondents remaining in the *Versatile*.

The *Centurion's* normal complement is about 250, of whom roughly one-half are disembarked before proceeding to the firing ground. All the remainder must be taken off by the *Shikari* before firing starts and put on board again when it ceases.

In even a moderate sea the operation of putting the destroyer alongside and transferring the men in safety is a ticklish one. In really rough weather it becomes too dangerous to be attempted. At seven o'clock this morning, however, when we sailed in the *Versatile* for our patrol ground, there was every promise of a fine, sunny day, and on getting clear of the land we found nothing but a gentle easterly breeze, with a calm sea and a moderately clear horizon.

Shortly before 9:00 A.M. the *Shikari*, which had sailed earlier, made her signal "Boarding possible." The first run was timed to start at 10:00 A.M., but shortly beforehand we saw a foreign steamer coming from the eastward and steering across the range. Approaching her, the *Versatile* draped herself in flags, but it was not until we were close alongside, flying "You are standing into danger" and hailing through a megaphone, that the vessel was at last persuaded to alter her course.

The *Nelson* opened fire, and we saw tall spray fountains leaping out of the water round the *Centurion*, which steamed stolidly on, occasionally altering her course to avoid punishment. Aëroplanes were overhead to spot the fall of the rounds and report by wireless, and before long the *Nelson* was hidden behind a smoke screen on the northern horizon; but still her rounds pitched about the target, and sometimes through glasses we saw a cloud of brownish dust as one went home. The *Centurion* was steaming at what looked like about fifteen knots, and it gave one an uncanny sensation to realize that there was not a living soul on board—that she was being steamed and steered by wireless from the *Shikari*, some distance astern.

The *Nelson's* first shoot ended at about 10:40 A.M., but at eleven-fifteen she carried out another run under similar conditions.

She finished in about a quarter of an hour, after which the *Adventure*, steaming down from the northward, engaged the *Centurion*, firing to starboard on a westerly course. Again we saw the splashes springing up from the sea all round the target, and though we were rather too far off to observe details, several hits were noticeable as puffs of brownish dust against the *Centurion's* grey hull. The practice was finally completed by 11:45 A.M., when the *Shikari* brought her charge to a standstill, went alongside, and trans-shipped the crew.

FRANCE

Destroyers

Naval and Military Record, July 17.—With the launching in an advanced stage of the *Frondeur, torpilleur d'escadre*, at the Caen Blainville Yard, the French navy is assured the advantage of possessing by the end of 1929, in instant readiness for service, a *torpilleur d'escadre* flotilla of twenty-six units of good fighting worth, and with a degree of homogeneity never before attained in the French navy. The *Frondeur* only differs from the 1923 *Simoun* by a few additional feet in length, a slightly increased width, and an extra displacement of some fifty tons. Otherwise, the twenty-six vessels are the reproduction of the same model, same silhouette, same armament, and same internal distribution. Early defects have been carefully corrected after a series of elaborate tests at sea under all conditions of weather. The first boats of the class were so lively that their guns could not be fought in a seaway. But since the top hamper has been reduced and special keels fitted, the stability has become satisfactory. On paper these boats are depreciated from their relatively slow speed; they hardly exceed thirty-three knots, whereas their English and Italian contemporaries are designed for thirty-seven and thirty-eight knots. But in practice the *Frondeurs* will be found, especially the last batches, to be faster at sea and for a long run than most of their rivals in other navies. Substance, not shadow, is what the French experts have been aiming at as the consequence of war lessons. *Contretorpilleurs* of pre-war types (*Bouclier* and *Casque* types) possessed on paper an amazing ensemble of qualities in small displacements; the hour of trial, however, found them too fragile for the hard work required from them, with the result that the Paris Admiralty has dropped all pretence at excelling on paper and been content with thirty-three knot boats but capable of keeping the sea and holding their own with cruisers in ordinary weather. And, last but not least, the twenty-six *torpilleurs d'escadre* have the advantage in gun and torpedo caliber and range over all destroyers of rival navies. They could take a part in cruiser actions under conditions more advantageous than those under which German light cruisers fought in the last war. The 1,500-ton flotilla has been deemed sufficient for immediate needs. The future belongs to superdestroyers of 3,000-tons and forty knots on the one hand and, on the other, to motor-vedettes of diminutive size and extreme speed—in the opinion, at least, of leading Paris experts.

ITALY

A Sea-Air Fleet

Naval and Military Record, July 10.—The Italian Naval Air Service appears to be developing the plan of maintaining a regular sea-air fleet in continuous service. A few days ago thirty-five Italian seaplanes anchored off Phalarum on their way home from Odessa, and the officers and mechanics were entertained by the Greek government. The plan, of course suggests the most efficient method practicable for naval air training, but it is beset by obvious limitations. The geographical situation of Italy in relation to her naval outlook happens to be particularly favorable to the maintenance of a permanent aërial fleet. From the moment that they leave their base until they return to it the machines are cruising over the active zone of the Italian fleet. In consequence they get plenty of opportunity for carrying out exercises, either with or against warships, and it is probably true to say that many of these exercises gain much in value from the fact of being quite unrehearsed, but carried out as chance offers, as similar operations would be in wartime.

For demonstration and spectacular effects the self-contained aërial fleet is naturally more impressive than the same number of aircraft concealed within the walls of an aircraft carrier. For practical purposes we fail to see any difference between the two. The aircraft-carrier flights can get away with re-

markable promptitude, and they start off at the spot where their services are required, with full petrol tanks, whereas the self-contained air fleet may as likely as not arrive with its fuel endurance far expended. The minimum speed on an aërial fleet debars it from keeping company with a force of warships save on very extravagant terms, constantly circling so as not to lose touch with its sea consorts. The aircraft carrier keeps station with her consorts. The Italian plan involves dependence upon static bases, whereas the aircraft-carrier is a mobile base. Probably the Italian scheme has reference to aërial coöperation with destroyers and submarines, which figure so prominently in the current phase of Italy's naval policy.

One interesting point suggests itself in connection with this Italian plan of maintaining a sea-air fleet as a self-contained and quite independent unit. In all discussions regarding international reduction of naval armaments it has been taken for granted that the aërial strength of a Navy is to be measured by its strength in aircraft-carriers. Restrictions as to the size and numbers of these are assumed to cover the whole subject. But the Italian principle renders it clear that this is not the case. With the ever-increasing range of action of the airplane dependence upon the aircraft-carrier steadily diminishes. Moreover, the general adoption of the launching catapult is resulting in all warships carrying aircraft, and even the new French "colonial cruisers," although they are to be of only 2,500 tons displacement, will be equipped with two apiece.

From this it is evident that the question of naval aircraft strength will have to be tackled in more direct way in any attempt to bring about general international reduction of sea power. Probably it had not occurred to the Preparatory Disarmament Commission that any naval country was likely to establish independent sea-air fleets. Very few of the sea powers could do so except to disadvantage, since the activities of such aërial fleets cannot extend into outer zones. In our own case the Royal Air Force undertakes coastal defense, so that the Fleet Air Arm is free for purely naval work. This work is just as likely to occur at Singapore or Hong-kong as at Portsmouth or Gibraltar, hence any idea of following the Italian plan would be out of the question for the British navy.

JAPAN

Industrial Mobilization

New York *Times,* July 28.—In the first week in July Japan began a series of "industrial mobilizations" which would simultaneously be ordered were the country threatened with war. The first experiment concerned the prefectures of Osaka, Kyoto, and Hiogo, where more than 600 plants were placed on a war footing and intensified the output of a great variety of articles which would be required in time of war—from clothes to arms.

Although all the technicians and workers were organized for war production, all the articles scheduled were not turned out; many of them remained on paper with attached reports showing what could have been done had the super-production been actually required.

Only twenty-four hours were occupied by the experiment, which was later applied to other manufacturing centers. In Japan it is called the "coöperative movement against war"—that is, against invasion—and in it, as it develops throughout the country, will be combined all municipal, naval, and military authorities, under the supreme command of the Chief of the National Resources Bureau, which is under the direction of the Cabinet.

Elaborate instructions were carried out in the three cities of Osaka, Kyoto and Kobe, where each factory had been ordered to prepare in record time the specialty allotted to it. The products actually made or prepared in record time were aspirin, shells, bullets, aircraft parts, oils and acids.

On the afternoon of the "war-day work" the chief of the National Resources Bureau broadcast a speech on general mobilization, while the defense forces manned guns on the tops of "sky-scrapers," airplanes hovered over the three cities while all within did their war-time "bit."

MERCHANT MARINE

"Bremen" Sets Atlantic Eastward Record, Making Trip in 4 Days, 14 Hours, 30 Minutes

New York *Times,* August 1.—Plymouth July 31.—The liner *Bremen* has won the

record for the eastbound crossing of the Atlantic. In a raging westerly gale she reached Plymouth at 11:30 P.M., British summer time tonight.

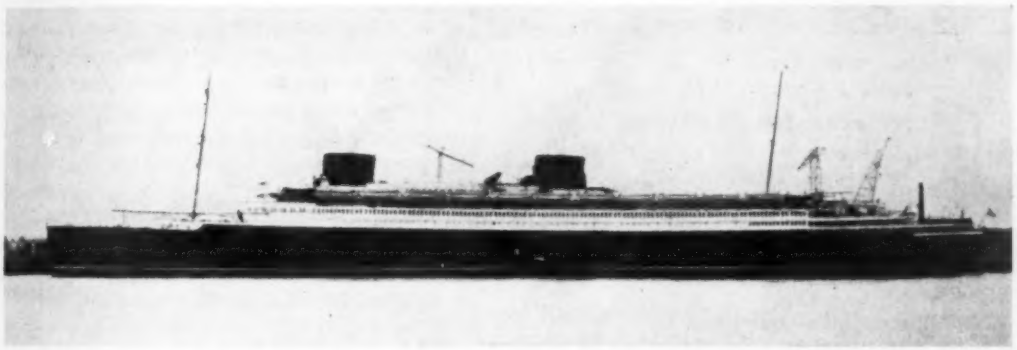
She traversed the 3,096 miles from Ambrose Channel Lightship to the Eddystone Lighthouse in four days, fourteen hours, thirty minutes. Her average speed was 27.91 knots.

The *Bremen's* best day's run of trip was the last when she covered 667 nautical miles, an average speed from noon to noon of twenty-nine knots. Her daily runs were 249, 629, 641, 651, and 667 nautical miles.

In crossing the Atlantic to Plymouth in four days, fourteen hours and thirty minutes, the *Bremen* broke all records for the trip by 7 hours and 21 minutes. The eastward record has been held hitherto by the Cunarder *Mauretania* in four days, twenty-one hours and 51 minutes.

The speed maintained by the *Bremen* is about a tenth of a knot faster than her speed of 27.87 knots an hour made from Cherbourg Breakwater to New York.

The distance from Plymouth to Cherbourg is 150 miles and should be steamed easily by the *Bremen* in five hours. She will arrive there before 7:00 A.M. today, Cherbourg time, which is 2:00 A.M. New York time, and will have made the passage from the Ambrose Channel Lightship to Cherbourg Breakwater via Plymouth, about 3,200 miles, in four days twenty-one hours, beating the *Mauretania's* record to Cherbourg of five days, one hour, forty-nine minutes by four hours, forty-nine minutes.



THE *BREMEN*, NEW SUPER-LINER OF THE NORTH GERMAN LLOYD

Helm Orders

Nautical Gazette, June 29.—No doubt the majority in nearly every school of seamen, except possibly sail, will be glad to learn that the new international helm orders, effective after June 30, 1931, must all be given in the direct sense, that is, by the word indicating the direction in which the wheel, the rudder blade, and the head of the ship shall move. And as the use of the actual words will be optional, there should be no prejudice in anyone. It is the thing that has been needed for a long time to eliminate the possibilities of confusion arising out of the different practices at different places in respect to indirect and direct orders. "Port" and "Starboard," right and left, or their equivalent words may be used.

Vestris Found Unfit By British Court

Charles A. Selden—Wireless to the New York *Times*, August 1.—London, July 31.—The court set up by the British Board of Trade to investigate the loss of the steamship *Vestris* last November announced today that it had found three men "were guilty of wrongful acts of default which contributed" to the disaster in which 112 lives were lost. Nine "main contributory causes" are enumerated and the report is supplemented by recommendations.

The enumeration of nine causes of the disaster found by the court follows:

First—Overloading beyond the load line.

Second—The tender condition of the ship.

Third—Insufficient margin of stability and reserve buoyancy.

Fourth—Heavy weather, high wind and

sea, causing the vessel to list to starboard.

Fifth—Leaks from the starboard ash ejector booby hatch on the shelter deck and half-doors on the upper deck.

Sixth—Upper deck hatches, starboard shelter deck bunker and cross-alleyway not battened down soon enough in some cases and not battened down at all in other cases.

Seventh—Water finding its way to the lower bunkers, saturating the coal and causing a list, probably preventing the pumps from working efficiently.

Eight—The scuppers, after a certain angle of list was reached, let water into the upper deck. These scuppers, not being plugged when the vessel listed, gave ready access to the sea and so reduced the margin of stability.

Ninth—Wing suctions were not fitted in all ballast tanks.

RECOMMENDATIONS BY COURT

Eight recommendations were made by the Court as follows:

First—That the same protection to life which is afforded the immigrant ships by means of Board of Trade supervision inspection should be extended to all foreign-going passenger ships.

Second—That the Board of Trade should invoke the assistance of consular or other independent responsible authorities to observe and record the draughts of British vessels sailing from foreign ports and report to the Board of Trade.

Third—That special emergency bilge suction pipes be supplied to the ballast donkey pump.

Fourth—Ship's officers should obtain data on how to effect pumping out ballast tanks, particularly when no wing suctions are provided.

Fifth—That wing suctions be fitted on all ballast tanks that have longitudinal divisions.

Sixth—That special attention be paid to the watertightness of hatchways fitted in corners and that hinged covers should be fitted.

Seventh—That flaps of coal trunks or chutes fitted at the ship's side to coal ports should be watertight.

Eighth—That the lifeboat list for passengers and crew should be prepared and boat stations exercised before sailing.

Proportion of Passenger and Cargo Ships

The Nautical Gazette, July 20.—To satisfy the several inquiries which we have received regarding the proportion of passenger and cargo ships in the world and under the American flag, we have obtained from the Bureau of Research of the United States Shipping Board the following table covering vessels of more than 2,000 gross tons, belonging to the eleven principal maritime countries, which were on April 1 operating in ocean service. These, of course, include ocean-going coastwise vessels.

While the 11 countries do not operate the total tonnage of the world, their proportion is so large that the figures and percentages, although subject to revision, may give a good idea of relative positions in respect to cargo and passenger ships.

MERCHANT SHIPS OF ELEVEN PRINCIPAL MARITIME COUNTRIES AS OF APRIL 1, 1929
(2,000 Gross Tons and Over)

	Passenger and Combination				General Cargo			
	No.	%	Gross Tons	%	No.	%	Gross Tons	%
United States	121	9.32	1,076,195	9.76	1,036	18.96	5,514,828	21.22
Great Britain	461	35.52	4,710,919	42.72	1,988	36.37	9,701,514	37.32
Japan	128	9.86	739,839	6.71	444	8.12	2,040,634	7.85
France	164	12.63	1,236,087	11.21	321	5.87	1,263,459	4.86
Italy	120	9.25	878,443	7.96	350	6.40	1,629,661	6.27
Netherlands	112	8.63	772,669	7.01	270	4.94	1,374,167	5.29
Norway	15	1.16	95,708	0.87	300	5.49	1,248,919	4.81
Germany	124	9.55	1,169,399	10.60	381	6.97	1,791,924	6.89
Sweden	11	0.85	84,252	0.76	139	2.54	554,664	2.13
Denmark	16	1.23	99,053	0.90	108	1.98	414,355	1.59
Spain	26	2.00	165,393	1.50	129	2.36	459,728	1.77
Total	1,298	100.00	11,027,957	100.00	5,466	100.00	25,993,853	100.00

AVIATION

New Air Mail and Passenger Line to be Opened in Near Future

The longest air mail and passenger line in the world will begin operation soon when the New York, Rio, and Buenos Aires Lines, Incorporated, starts regular schedule service between New York and Buenos Aires.

Although the line will probably be in operation by fall, December 1 has been set as the date on which regular schedule service will be in effect.

Flying over an 8,000-mile course with forty-two stops in the United States, the Islands of the Caribbean, and South America, the new line will bring Buenos Aires within seven days of New York City. The company's flagship, the *Washington*, left New York recently for an inspection trip of the entire route. Carrying seven passengers, two of which are women, it is the first passenger ship to make the South American trip.

Although the entire route covers a distance of 8,000 miles, the ships will not be out of sight of land more than fifteen minutes during the entire journey. This will be between Miami and Havana when sea planes will be used to negotiate the passage.

Ford all-metal tri-motor planes will be used almost exclusively on the rest of the route. Orders for seven of these huge ships have already been placed. One has been delivered and shipped to South America aboard the Winston Steamship *American Legion*. This is the first Ford plane ever sent to South America.

The New York, Rio, and Buenos Aires Lines, Incorporated, which will operate the only Eastern airline between North and South America, have already closed contracts with the governments of Argentine and Uraguay to carry mail between those two countries and the United States. Other contracts with a number of South American countries are now in negotiation.

Authorities believe that this Eastern air link between the two Americas will rapidly become one of the most important commercial air lines in the western hemisphere. It is pointed out that 95 per cent of all commerce between the United States and South America is with the Eastern seaboard countries.

Safety precautions will include a series of radio stations which will form a network over the entire route and will keep planes in continuous communication throughout the journey. Twelve radio stations have already been installed and are ready for operation.

Within eight months from the inauguration of the service, the installation of beacons and other equipment for night flying will have been completed. This elimination of the necessity for night stopovers will cut the original flying time almost in half.

The company has recently acquired a substantial interest in all of the landing fields owned in South America by the Aero Postale and will use these fields as part of its system. The Aero Postale has operated an air mail route between Paris and Buenos Aires for more than a year without serious mishap.

New Aircraft for the Navy, July 1

The Bureau of Aëronautics, Navy Department, has recently let contracts for five experimental planes, 147 service planes and 168 service engines, at a total cost of $4,172,949 as a continuation of its Five-Year Building Program. Contracts were awarded as follows:

Fifty-one NY-1 planes. Contract awarded to the Consolidated Aircraft Corporation, Buffalo, N. Y. Total contract price, $349,492. The standard Navy training plane, a two-seater, convertible, single-float biplane.

One JR-3 plane. Contract awarded to the Ford Motor Company. Contract price, $60,478. This plane is an all-metal transport plane, capable of carrying a crew of two, and ten passengers, and will be equipped with three Pratt & Whitney "Wasp" engines.

Thirty-six F8C-4 planes. Contract awarded to Curtiss Aëroplane and Motor Company, Garden City, N.Y. Total contract price, $682,000. The latest type of Curtiss fighter, a two-seater landplane for aircraft carrier and Marine Corps service.

Eighteen TG-1 planes. Contract awarded to Great Lakes Aircraft Corporation, Cleveland, Ohio. Total contract price, $654,000.

One XT6M-1 plane. Contract awarded to the Glenn L. Martin Company, Baltimore, Md. Contract price, $85,000. A high speed experimental torpedo landplane for use in aircraft carriers.

One XOJ-1 plane. Contract awarded to Berliner-Joyce Aircraft Corporation,

Baltimore, Md. Contract price, $62,000.

One XOK-1 plane. Contract awarded to Keystone Aircraft Corporation, Bristol, Pa. Contract price, $55,000. A two-seater observation plane similar to the XOJ-1.

Forty-two O2U-4 planes. Contract awarded to Chance Vought Corporation, Long Island, City, N. Y. Contract price, $708,479. This is a single-float observation plane equipped with "Wasp" engine, to be used in connection with catapults on battleships and cruisers.

One XP2M-1 plane. Contract awarded to Glenn L. Martin Company. Contract price, $150,000. An all-metal flying boat, powered with three Pratt & Whitney engines of the latest design.

One hundred thirty-two Wright "Cyclone" engines. Contract awarded to the Wright Aëronautical Corporation, Paterson, N.J.

Thirty-six Pratt & Whitney "Hornet" engines. Contract awarded to Pratt & Whitney Aircraft Corporation, Hartford, Conn.

The last mentioned plane, the XP2M-1, is the latest development of the Navy's PN series of flying boats, which now hold eight world's records. It will be an experimental patrol boat of the monoplane type and will carry a crew of five persons. The Navy has been building flying boats for the past fifteen years, and has operated them successfully over the roughest kind of water. Several commercial lines are waiting for the final results of this development before putting flying boats in service on their new lines. The Navy Department policy has always been to coöperate to the fullest extent in the development of commercial aviation.

Diesel Engines in Aircraft

New York *Herald Tribune*, by George Gardner.—The Diesel engine, adapted for use in the aircraft industry, interests all engineers, regardless of their attitude with respect to its possibilities, it is revealed by inquiries to the leading aircraft manufacturers.

The viewpoint of one school of engineers was expressed by C. M. Keys, president of the Curtiss Aëroplane and Motor Company and president of the new Curtiss-Wright Corporation. Mr. Keys believes the Diesel engine has a chance to supplant all other types of airplane motors.

"I do not say this because of its low fuel consumption," said Mr. Keys. "This is a relatively unimportant factor. Its two great advantages are that it permits more efficient radio communication and minimizes the fire risk.

"These things far outweigh fuel consumption. For example, the Transcontinental Air Transport planes operate at a cost of about fifty cents a mile. Only about two and one-half cents of this is for fuel."

Mr. Keys said that the Curtiss Company had been experimenting with Diesel engines for about four years, and that other engine companies also had investigated them. The research is pursued with utmost secrecy, however, as the engineers are unwilling to make any claims for their motors until they have worked out every detail satisfactorily.

The Curtiss-Diesel is reported to be of the nine-cylinder radial type, developing 400 horsepower at 1,500 revolutions a minute. It is said to employ single-acting hot-air injection operating at 185 pounds pressure. The design is said to be of such a simple character that troublesome features of other types have been eliminated.

Work on the engine is going forward in the research laboratories of the Curtiss company in Buffalo.

Mr. Keys expressed particular interest in the Packard-Diesel engine, which has been flown in a plane, but which is not yet produced for the market. The Packard company has not shown it to other engineers.

It uses crude petroleum for fuel, and a plane powered with one of the motors flew from Detroit to Langley Field, Virginia, 650 miles through heavy storms. Although most aëronautical engineers agree with Mr. Keys that low fuel expense is unimportant, it was pointed out that the fuel used for this flight cost only $4.68, as compared with $24 which would have been the cost of high-test gasoline for the trip. The motor weighs less than three pounds a horsepower. It is started by pressing a button in the pilot's cockpit.

The adaptability of the Diesel motor to planes equipped with radio will mean much to the aviation industry, according to Mr. Keys. He pointed out that the air transport lines all over the country are installing radio on all of their planes for weather reports and for communication in general.

The interference with the sending and receiving apparatus caused by the motors now in use makes it less valuable than it might

be otherwise. It is anticipated that the Diesel engine will solve this problem.

Some of the other companies that have examined the possibility of substituting a Diesel type for those motors now in use are less sanguine as to its capabilities. They do not believe that the difference in weight and in cost of operation justifies making the change, although no manufacturer would reject the Diesel engine if he found that it was better than a gasoline motor.

The Wright Aëronautical Corporation has had engineers working on a Diesel type for several years. Their attitude after seeing the motor in their own laboratories is that its advantages do not justify the change, which would be a radical one. However, the company is watching developments in the field.

Recent developments in cooling liquids for aircraft engines have focused attention upon engines of this type. Those who have developed these motors which use ethyleneglycol with a boiling point of 212 degrees Fahrenheit and a very low freezing point, are able to employ much smaller radiators because of the character of the liquid. They declare that the fluid will make possible a motor much lighter and with less parasitic resistance. This would be a competitor of the Diesel with regard to weight perhaps, but as it stands at present would not compete in adaptability for radio.

Ice Formation on Planes Studied in Wind Tunnel

The New York *Herald Tribune*, July 14.—Langley Field, Va., July 13.—Weather conditions simulating those which cause the formation of ice on airplanes in flight are produced in a new wind tunnel in operation at the laboratory of the National Advisory Committee for Aëronautics here.

The formation of ice along the leading edges of airplane wings and on struts and wires long has been a problem of aircraft operation and the subject is under investigation in the tunnel with the object of devising ways to overcome it. Ice building up along the leading edge will change the character of a wing and sometimes force a plane to land because the lifting power of the wing has been decreased by the change in profile.

In the new wind tunnel, a small affair with a six-inch mouth, ice may be seen building up on tiny model wings or wires used in the experiments. At temperatures just below the freezing point the ice formations usually come when the air is damp, and these conditions are produced in the wind tunnel.

Dornier Sees Way to Evade Crashes

The New York *Times*, July 7.—Berlin, July 6.—The three principal factors responsible for the greatest percentage of all airplane accidents, as viewed by Dr. Maurice Dornier, are firstly, pilots overburdened; secondly, motors overstrained; thirdly, conduits and steering apparatus inaccessible.

Pilots, he declared, are not only occupied in steering their planes, but they are also forced to observe many instruments and navigate at the same time. In most cases, he said, they are unprotected against bad weather.

Motors, he explained, were constantly driven at full capacity, and making repairs in the air was impossible.

Fuel conduits and control units, from his experience, were only incompletely accessible and he has found that hundreds of forced landings are due to a breakage in the gasoline pipe which could not be repaired. Destruction through fire, Dr. Dornier declared, is a sad chapter in the history of flying and most fires were caused by leaking tanks from which the benzine runs over the heated motors.

Innovations in his new giant flying ship *Do-Ox*, succeeded he believed, in overcoming these difficulties. The pilots in it are able to concentrate on "flying" and they need not simultaneously be pilot, engineer and navigator. An engineer is assisted by four mechanicians responsible for the technical work. The commander, with a first officer, directs the course and gives the orders to the crew. Nobody is overburdened and everyone is able to concentrate his whole attention on a special task.

The motors in the *Do-Ox* have plenty of reserve and can be throttled about 40 per cent right after the start.

Another important factor is the subdivision of the effect of the motors heretofore unheard of, namely by twelve independent units. Formerly, if one of three of a maximum of four motors with which planes were fitted ceased to work an immediate forced

landing or the loss of one-quarter to one-half of the entire effect was the result. With the *Do-Ox* the loss would be only one-twelfth.

All the motor control units can be easily attended to and repaired and all the conduits can be constantly observed and any foreign obstacle immediately removed during flight.

The fuel reserves are far away from the motors in the deepest end of the ship's body and they are kept separated by fireproof compartments. A connection between the benzine flowing out of these tanks and the motors is wholly impossible and the entire fuel reserve can be protected against explosions by neutral gas.

Plane Secures to Dirigible in Flight

The New York *Times*, July 7.—Successful tests of a dirigible as a mother ship for an airplane were conducted by the Navy at Lakehurst last week. Lieutenant J. Gorton, in a Vought biplane, timed his speed to the cruising gait of the *Los Angeles*, attached a hook on the upper edge of his wing to a rigid trapeze hung amidship of the big bag and was towed along and afterward disengaged. The possibilities of personal report of pilot to commanding officer in the dirigible, of defense of the airship by its attendant satellites and of the extension of the offensive effectiveness of a dirigible so equipped and escorted are pregnant. It will be of interest to watch the further development of this idea, including the housing of airplanes within or partly within the dirigible hull.

The World's Largest Airplane

By Francis D. Walton, July 28.—The answer to the critics of heavier-than-air craft who said that it never would be possible to suspend satisfactory payloads on the fabric or metal wings of an airplane is being launched from the drafting boards of aëronautical engineers all over the world.

The possibilities of Dr. Claudius Dornier's *Do-Ox* twelve-motor 100-passenger seaplane, which has recently startled the world that considered itself air-minded, has given the first concrete indication that there may be something in the claim of airplane designers that the sizes in which heavier-than-air flying machines may be built are unlimited.

The *Do-Ox*, which recently underwent its first test flights in Germany, is the largest airplane ever built. It stands today as an outpost in aëronautical designing, and it is likely to maintain that position for a long time to come, regardless of its measure of success in actual operation. Its value in aëronautical designing will be that of marking a definite limit in size; it will curb the race merely to build bigger ships and will act as a guardian of peace in the engineering world, while the plane sizes between the existing standard ships of eighteen and twenty passengers and the 100-passenger capacity of the *Do-Ox* are limned in. It is the belief of conservative engineers that in the "filling in" process it will be discovered that the ultimate, and final airplane, as regards size, will be attained.

The *Do-Ox* has been designed for long distance operation over oceans. The airway on which it is planned to operate the plane has determined in a large measure its size. What the Dornier engineers sought was a plane capable of alighting on and withstanding the action of seas, such as trans-Atlantic liners frequently encounter. To achieve this it was necessary to go into standard marine designs for the construction of the hull of the plane. The resulting size of the *Do-Ox*, which gives room for 100 or more passengers, is mainly incidental to the primary condition of construction.

This gigantic ship is a metal-built flying boat three and a half times larger than the Dornier Super-Wahl with which Major Ramon Franco recently attempted to fly across the Atlantic. It has three decks. It has a wing spread of 164 feet, and on the water it draws four feet, and the propellers are twenty-four feet above the hull.

On the lowest of the three decks 4,000 gallons of benzine, 1,500 kilos of oil, ballast, provisions, spares and tools are stored.

The middle deck, sixty-seven feet long, consists of a salon with sleeping quarters for passengers, on both sides of a central passageway. Forward is a baggage compartment, while the cook's galley, electrically equipped, is aft.

The motive and sustaining power of the *Do-Ox* is taken from twelve air-cooled Siemens-Jupiter motors. These engines are arranged in tandem atop in the main, large wing, six in front and six behind. They develop 6,300 horsepower.

Although the plane has been put through its first test flights and has made these suc-

cessfully, little has been made public about the actual performance figures of the plane. In one of the first tests the *Do-Ox* took off with seventeen passengers and with only eight motors operating. But nothing of importance can be determined from these figures.

The eight motors were not only carrying the weight of seventeen passengers, but also the total weight of the entire ship, including the dead motors. No indication is given of how much fuel or how much of the full flying equipment for 100 passengers was aboard during this test.

It is just at this point that it is necessary to pause for consideration of what is the most efficient airplane, regardless of size. If eight passengers can be carried in a plane requiring only a single 300-horsepower engine to fly it, the same ratio of horsepower a passenger must be maintained in going into larger-sized airplanes. A huge ship capable of carrying 100 passengers, but needing sixty or more horsepower for each passenger, will not meet the requirements of sound operation. And it is the determination of these factors which will have most to do in fixing the size of the passenger airplane.

Navy Ship Begins Survey for Atlantic Seadrome

The Baltimore *Sun*, July 12.—Washington, July 11.—The U. S. S. *Hannibal* has begun a survey of an area in the Atlantic Ocean about halfway between New York and Bermuda for a seadrome development company which expects to place the first artificial island there for the landing of airplanes, the Bureau of Navigation, Navy Department, announced today. The *Hannibal* recently returned from survey duty on the north coast of Cuba and began this unique work.

The area being surveyed covers approximately 1,200 square nautical miles.

New Airways Map

Aviation, June 29.—Chicago.—Rand McNally & Company has announced publication of a new airways map of the United States. It is a wall map measuring 42x28 inches on a scale of 80 miles to the inch, printed in six colors, showing state and international boundaries, the principal cities, rivers and lakes, and the mountains. Established air routes and lines of equal magnetic variation are shown in red. Mileage distance circles are drawn at 500-mile intervals around the point at which the map is to be used.

The map is drawn on a conic projection based on two standard parallels, which makes it possible to measure airline distances and directions directly from the map with practical accuracy.

Accompanying each map is an index booklet which lists and locates towns on the map and gives the population of each. A comprehensive article on the elements of "Practical Air Navigation" is also included in the booklet. The article covers the instruments of navigation, the plotting of the course, the use of the compass in connection with the map, tables for correction of magnetic course according to wind velocity, time and distance chart, a number of practical navigational problems which are explained and solved, extracts from the Department of Commerce air traffic rules, and an explanation of the aids to navigation, such as lights and radio beacons.

The map is available in several different mountings including cloth and board for use as a wall map and may be obtained in sheet form for use on a desk or table under glass.

Special air map folders have recently been completed by the company, for Northwest Airways, Inc., operating service between this city and St. Paul and Minneapolis, Minn., and for Curtiss Air Line, offering Sikorsky service between New York and Atlantic City. Information and pictures complete the folders, which are especially designed for distribution among passengers.

New Army Officers Favor Air Service

The Baltimore *Sun*, July 5.—Washington, July 4.—The fascination of the cavalry and the artillery for the nation's future army generals has been surpassed by the appeal of aviation, the War Department revealed.

More than one-third of the class which graduated in June from West Point wishes to go into the flying branch of the army.

Of the total of 297 West Point graduates, 115 made application for assignment to the Army Air Corps. In making assignments to various branches of the army, the War Department has adopted the policy of waiting until candidates for aviation qualify as airplane pilots before naming them.

Each of those who have applied for assignment to the Air Corps will be given an opportunity to try out, first taking the physical tests and, if successful, going to the primary and advanced flying schools.

Of the 115 who wish to win their general's epaulets by way of the air corps, all but fourteen have passed the physical examination. The department thinks "it is possible that a fair percentage of the fourteen remaining candidates will have their minor physical defects corrected so as to enable them to pass the rigid physical examination for flying."

The second lieutenants who successfully get by the physical tests will report at the primary flying school at Brooks Field, San Antonio, Texas, on the expiration of their graduation leave of absence, but not later than November 1.

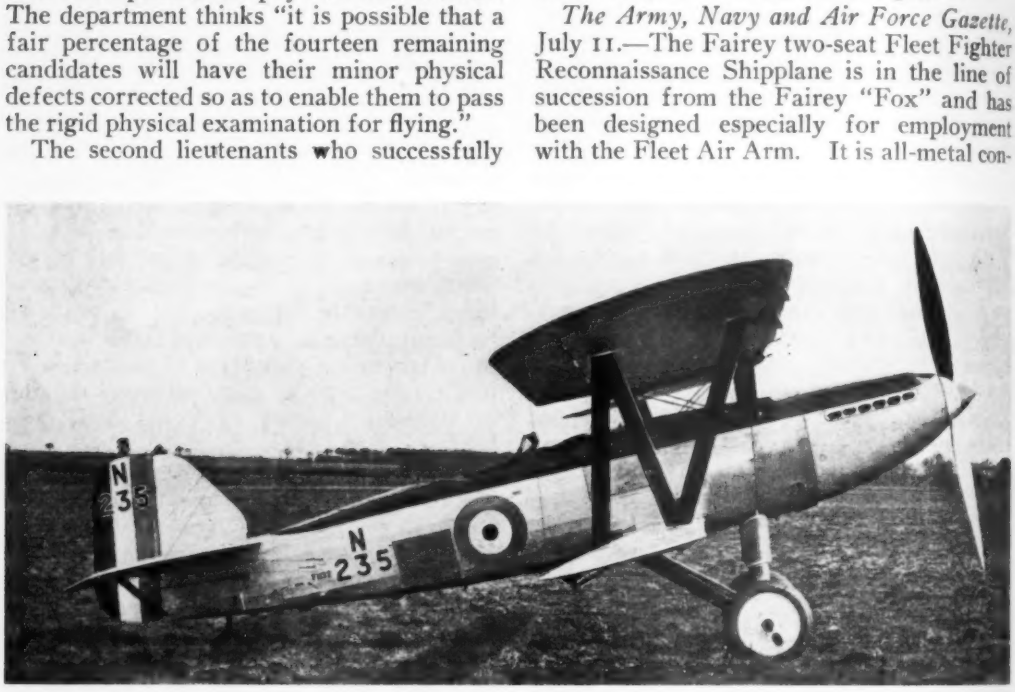
If all successfully become flying pilots more officers from this year's West Point class will go into the air corps than into any other branch of the army service. The infantry would receive the second largest number, with eighty-four. The field artillery would get forty-three members of the class, the coast guard artillery twenty-nine, the engineer corps and the cavalry each seventeen and the quartermaster's corps six.

This division of the class among the various branches of the army service, it was said, is a good indication of the ranking importance. It is notable that the cavalry, once the backbone of warfare, now has descended to the level of a non-combatant service.

Any of the 101 candidates for the air corps who fail to complete their flying course will be redistributed to these other branches of the army.

The Fairey Two-Seater Fleet Fighter

The Army, Navy and Air Force Gazette, July 11.—The Fairey two-seat Fleet Fighter Reconnaissance Shipplane is in the line of succession from the Fairey "Fox" and has been designed especially for employment with the Fleet Air Arm. It is all-metal construction with staggered planes of unequal chord—the upper plane being the wider.



A NEW FLEET FIGHTER
The Fairey two-seater Fleet Fighter Reconnaisance Shipplane (Rolls-Royce F-type engine)

The undercarriage has oleo legs, and independent brakes are fitted to the wheels. An alternative undercarriage for sea use can be fitted. This alternative undercarriage is constructed of steel and has duralumin floats.

The engine normally fitted is a supercharged Rolls-Royce F type. The rear cockpit has a Fairey high-speed gun mounting.

Dimensions of the machine: span, 37 ft.; chord upper plane, 7 ft. 3 ins.; chord lower plane, 4 ft. 3 ins.; overall height, 11 ft.; overall length, 29 ft. 6 ins.

Novel Landing Gear Allows Amphibian to Use One Wheel

The New York *Times*, July 7.—The Grover Loening Company recently com-

pleted and flew the first monowheel amphibian, landing and taking off from both water and land with success at Port Washington and Roosevelt Field. Grover Loening, the designer, and B. Alison Gillies, vice-president of the company, made the series of tests.

The new amphibian gear has been attached to a standard model Moth. It consists of a single main float, seventeen and a half feet long and thirty inches wide, with a small welded float of duralumin projecting on each side. The single wheel and retracting mechanism draws into a pocket in the main float in direct combination with small doors which open and close with the corresponding position of the wheel.

The operating mechanism consists of two toggle levers so hinged that when the wheel is down they lock to carry the load. The construction used is combined with balancing springs for the weights in such a way that it takes only a few seconds to make the change from landplane to seaplane by operating a lever in the cockpit. In this way the usual process of raising or lowering amphibian wheels is avoided. The shock is taken up with the use of rubber discs.

The Moth is a standard ship but is equipped with one of the old Cirrus Mark II motors instead of the Mark III of higher power. The amphibian gear adds only eighty pounds over the regular land geared plane, including floats, wheels and operating mechanism. This gives the plane a gross weight of 1,020 pounds. The speed has been lowered only four miles an hour, according to the tests. The flying characteristics of the ship had not changed otherwise, Mr. Loening said.

The plane took off from the water at Port Washington and flew to Roosevelt Field, where a landing was made. Several landings and take-offs were made there before returning. Between 150 and 200 feet of runway were used in taking off, the little ship balancing on the single wheel each time after starting and the pilot riding it along like a bicycle. Struts have been placed on the wing tips to hold the ship in position when at rest and to function as guard for the side floats against ice or driftwood when it sits in water.

The wheel is also intended as a guard for under keel of the float. It permits the machine to be readily pivoted about and its size and the manner of support it receives from the bottom of the float prevent the ship sinking or sticking in soft mud or sand. The little amphibian gear is the first product of the new company organized by Mr. Loening last winter following shortly the merger of his company with Keystone.

The Stieger Mono-Spar System of Aircraft Construction

The Mono Spar Co., London.—Of greatest possible interest to all concerned in aircraft is any improvement which results in a substantial reduction in structure weight of airplanes. During the past two years an analysis has been made by the Mono Spar Co. of the most modern airplane wing structures, combined with elaborate calculations and tests. As a result a scientifically designed single spar wing of entirely unconventional type, based on definite aërodynamic and structural principles, has been produced. This system of construction which has been evolved by H. J. Stieger and covered by a series of world-wide patents, shows a great saving in weight and possesses great and definitely calculable torsional stiffness without the necessity of metal or plywood covering.

For this system of construction the following claims are made:

1. It is considerably lighter than any other cantilever monoplane wing structure. On larger sizes the actual saving is very great indeed. (On a plane of the Beardmore inflexible type a saving of over 5,000 pounds in weight could be effected.)

2. It is possible to obtain the aërodynamic advantages of a full cantilever monoplane with a lighter structure weight than the corresponding biplane.

3. All stresses and deflexions can be accurately calculated; this is particularly important in the case of torsion. There is no known accurate method of calculating the stress in the usual metal or plywood covering of a cantilever monoplane wing.

4. Particular care has been taken in the design to overcome "flutter," and in this respect the design corresponds closely to the ideal design conditions indicated by Mr. Frazer of the National Physical Laboratory in a paper on Aëroplane Wing Flutter and read by him before the Royal Aëronautical Society on February 28, 1929.

5. Torsional stiffness is unaffected by bending loads applied to the wings. This is of special importance when considering large aspect ratios.

6. For a given torsional strength the stiffness is greater, i.e., the twist is less than in any other structure.

7. Stiffly supported points within the wing structure for attaching engines, under carriages, etc., are provided in convenient positions.

8. The well tried fabric covering which is light, cheap and easy to repair can be safely employed.

9. Great robustness of all important members.

10. Freedom from obstructions within the wing, making room for tanks, etc., if required.

11. Cheapness of manufacture. The number of the main structure parts is reduced, and the elimination of metal covering greatly reduces the expensive item of riveting. Wing structures can be produced in any of the usual materials without greatly affecting the result.

In the normal wing structure it is usual to provide two or more spars which have to carry the weight of the machine in the air and to keep the wing structures rigid in torsion so as to maintain the correct incidence of the wing in relation to the fuselage under all conditions.

When calculating the stresses imposed upon the structure it is necessary to deal separately with the two extreme positions of the center of pressure and in England, in addition, an emperical safety factor is adopted for the "nose dive" condition. It is apparent that when the center of pressure is in either position, in the case of a two-spar wing structure, one spar obviously is not carrying its full share of the load. In addition it must be remembered that the relative position within the wing of the two spars connot be allowed to change as this seriously affects the angle of incidence of the wing as a whole. This last point is easily met in the case of a biplane owing to the big depth of girder.

In the case, however, of the aërodynamically far more efficient cantilever monoplane, the problem of connecting the spars rigidly together has always been a very difficult one. In the past, it has been solved usually by connecting the two spars together top and bottom by a rigid material such as plywood or metal covering, thereby converting the structure into a box and using the surfaces so formed as the surfaces of the wing.

This system at first sight seems very suitable but it can be shown that the material of the stiff covering so arranged is actually very inefficiently employed as it is necessary to stabilize such surfaces against local buckling by numerous stiffening members, and in addition, there is no known method of calculating accurately the stresses developed in such coverings. Furthermore plywood or metal is about three times as heavy as fabric.

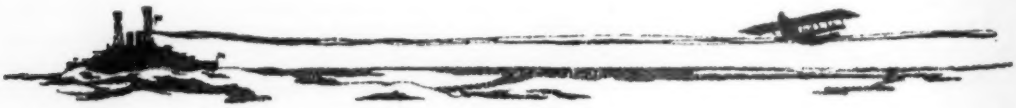
In the Stieger-Mono-Spar system only one spar is used *at the maximum depth* of the wing section. This single spar carries the weight of the machine under all load conditions and is, therefore, always fully employed.

The spar itself is exceptionally well stabilized by torsion bracing. Calculations show that a reduction of over 40 per cent in the spar weight can be effected by using one spar instead of two owing to the more efficient utilization of the structural material under all conditions.

The torsion loads, due to changes of center of pressure and also due to the ailerons, are carried direct to the spar through ribs and these also stabilize the flanges of the spar.

The spar itself is rendered torsionally stiff by a system of pyramid bracing mounted on each side of the spar.

Drag and anti-drag loads are taken by tension members lying parallel to the axis of the spar and connecting the apices of the pyramids together.



Statement Showing Ships of the Navies of the Five Principal Powers within the Effective Age of 20 Years for Capital Ships, Aircraft Carriers and Cruisers, 16 Years for Destroyers, and 13 Years for Submarines

DATA REGARDING SHIPS AFFECTED BY THE TREATY

Information as of July 1929.

Type	United States		British Empire		Japan		France		Italy	
	No.	Tons	No.	Tons	No.	Tons	No.	Tons	No.	Tons
Capital ships[1] (under effective age of 20 yrs.[2])										
Battleships built	18	525,850	16	433,650	6	191,320	9	194,556	4	89,976
Battle cruisers built	..	.....	4	122,700	4	110,000	..	.....	..	.....
Total capital ships	18	525,850	20	556,350	10	301,320	9	194,556	4	89,976
Aircraft Carriers (under effective age of 20 yrs.[3])										
Built	3	78,700[4]	5	88,950	3	63,300	1	21,653	..	.....
Being converted or appropriated for	1	13,800	1	18,600	..	.....	..	.....	..	.....
Total aircraft carriers	4	92,500	6	107,550	3	63,300	1	21,653	..	.....

[1] There are no capital ships building, appropriated for or authorized.
[2] There are no capital ships over 20 years of age.
[3] There are no aircraft carriers over 20 years of age.
[4] Standard displacement, for *Lexington* and *Saratoga* does not include weight allowance under Ch. II, pt. 3, Sec. 1, art. (d) of Washington Treaty for providing means against air and submarine attack.

DATA REGARDING COMBATANT SHIPS WHOSE NUMBERS ARE NOT AFFECTED BY TREATY

	United States		British Empire		Japan		France		Italy	
	No.	Tons	No.	Tons	No.	Tons	No.	Tons	No.	Tons
Cruisers:										
Built	10	75,000	52	308,700	28	163,955	11	89,369	11	63,419
Building	8	80,000	7[2]	66,600[2]	5	50,000	4	36,496	5	30,000
Appropriated for	10[1]	100,000[1]	3[3]	22,000[3]	...	.....	1	10,000	6	50,000
Authorized	5[1]	50,000[1]	...	.....	...	.....	...	.....	...	.....
Total	33	305,000	62	397,300	33	213,955	16	135,865	22	143,419
Destroyers:										
Built	284[4]	337,996[4]	153[5]	189,165[5]	99	108,260	58	69,291	71	76,995
Building	...	.....	20	26,960	8	13,600	18	39,064	11	22,000
Appropriated for	...	.....	9	12,160	8	13,600	6	15,876	8	10,536
Total	284	337,996	182[5]	228,285[5]	115	135,460	82	124,231	90	109,531
Submarines:										
Built	108	81,807	50	45,572[7]	61	61,357	45	35,631	40	20,696
Building	2	5,520	14[8]	21,860[8]	6	10,220	32	40,331	13	10,784
Appropriated for	3	4,700[6]	6	9,420	4	6,920	15	14,922	11	7,368
Total	113	92,027	70	76,852	71	78,497	92	90,884	64	38,848

CRUISER SUMMARY (BUILT, BUILDING, APPROPRIATED FOR, AND AUTHORIZED) SUBDIVIDED ACCORDING TO CALIBER OF GUN MOUNTED.

Cruisers	United States		British Empire		Japan		France		Italy	
	No.	Tons	No.	Tons	No.	Tons	No.	Tons	No.	Tons
3.9″-gun type							1	3,396	2	6,890
4.7″-gun type									3	11,302
5.5″-gun type					17	86,605				
5.9″-gun type							3	16,732	3	14,305
6″-gun type	10	75,000	40	181,680	4	18,950			6	30,000
6.1″-gun type							4	28,198		
7.5″-gun type			4	39,020			2	27,657		
8″-gun type	23	230,000	18	176,600	12	108,400	6	59,882	6	60,000
10″-gun type*									2	20,922
Total	33	305,000	62	397,300	33	213,955	16	135,865	22	143,419

* Built before Washington Treaty which limited future cruiser building to 10,000 tons and 8″ guns.

[1] The 10 cruisers shown as appropriated for, plus the 5 shown as authorized, constitute the 15 cruisers authorized by the last Congress to be laid down, 5 in fiscal year 1929, 5 in fiscal year 1930 and 5 in fiscal year 1931. The first 5 were to be built, 2 by private contractors and 3 by Government yards. The President recently announced that the 3 to be built by Navy Yards, which would ordinarily have been laid down this autumn, have been held up.

[2] Includes *Surrey* and *Northumberland*. Prime Minister recently announced that work on these 2 cruisers had been suspended.

[3] Tonnage of 2 of these is estimated.

Note: U. S. cruisers: The 10 shown as built are of the 6″-gun type. The 23 shown as building, appropriated for, and authorized are the 8″-gun type.

British cruisers: In the 52 shown as built there are 38 of the 6″-gun type, 4 of the 7.5″-gun type and 10 of the 8″-gun type. The 7 shown as building are of the 8″-gun type. In the 3 appropriated for, 2 are of the 6″-gun type and 1 of the 8″-gun type.

Japanese cruisers: In the 28 shown as built, 17 are of the 5.5″-gun type, 4 of the 6″-gun type and 7 of the 8″-gun type. The 5 shown as building are of the 8″-gun type.

French cruisers: In the 11 shown as built there is one 3.9″-gun type, 3 of the 5.9″-gun type, 3 of the 6.1″-gun type, 2 of the 7.5″-gun type, and 2 of the 8″-gun type; of the 4 building, 1 is of the 6.1″-gun type and 3 of the 8″-gun type. The 1 appropriated for is of the 8″-gun type.

Italian cruisers: In the 11 shown as built, 2 are of the 3.9″-gun type, 3 of the 4.7″-gun type, 3 of the 5.9″-gun type, 1 of the 8″-gun type, and 2 of the 10″-gun type. Of the 5 shown as building, 4 are of the 6″-gun type and 1 of the 8″-gun type. Of the 6 appropriated for, 2 are of the 6″-gun type and 4 are of the 8″-gun type.

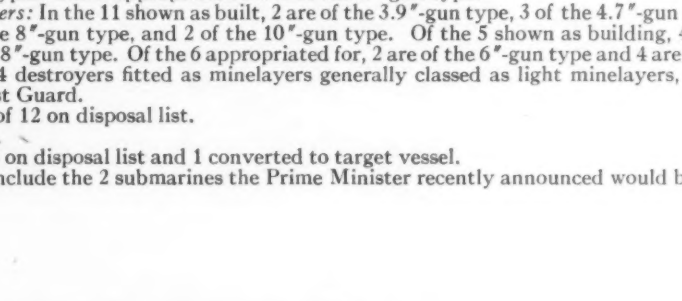
[4] Includes 14 destroyers fitted as minelayers generally classed as light minelayers, and 10 destroyers under U. S. Coast Guard.

[5] Exclusive of 12 on disposal list.

[6] Estimated.

[7] Excludes 5 on disposal list and 1 converted to target vessel.

[8] Does not include the 2 submarines the Prime Minister recently announced would be canceled.



NOTES ON INTERNATIONAL AFFAIRS

From July 4 to August 3

Prepared by Professor Allan Westcott, U. S. Naval Academy

FAR EAST

Manchurian War Menace.—Rupture of diplomatic relations between the Soviet Republic and the Chinese Nationalists, together with serious danger of war, followed the arrest on July 10 and subsequent expulsion of nearly 200 Soviet officials of the Chinese Eastern Railway by Manchurian police. The railway telegraph and telephone offices were also seized, as well as Soviet commercial headquarters at Harbin and other points.

On July 13 the Soviet government sent a sharp note demanding cancellation of "arbitrary orders" regarding the railway, release and protection of Soviet citizens, and finally a conference on all questions relating to management of the railway. A reply was requested in three days, and if this were not acceptable it was added that the Soviet government would find "other means in defense of the U. S. S. R.'s legal rights." The Chinese reply made similar demands and justified their action as necessary "for the suppression of Communist propaganda and maintenance of order in Manchuria." Diplomatic relations were severed, both sides began concentration of troops, and there were reports from Chinese sources of seizure of property and clashes between troops at Pogranichnaya and other points on the frontier.

Secretary Stimson's Reminder.—On July 20 Secretary of State Stimson conferred with representatives of France, Great Britain, and Japan, taking advantage of the clause in the Washington Four Power Treaty which provides for conference on all Pacific problems, and sent reminders to both China and Soviet Russia that their action threatened violation of their obligations under the Kellogg-Briand Peace Treaty, to which both were parties. Contact with Russia was made through the medium of France. Spokesmen of both governments gave assurances that there had been and would be no violation of the treaty.

Parleys Started.—On July 31 it was announced that representatives of China and Russia had met at Manchuria, on the western Manchurian frontier to settle the time and place for a conference on the railway problem. Before such a conference takes place, however, the Soviet authorities are insistent that the *status quo ante,* as regards the railway, shall be restored. Under Chinese control, conditions on the railway were reported to be demoralized, local generals having seized rolling stock for their own use.

China's Motives.—The following account of China's aims in seizing the Chinese Eastern Railway is from a correspondent in the Baltimore *Sun* of July 22.

> The immediate cause of the drive on the Chinese Eastern Railroad, was the necessity of doing something to consolidate the none-too-secure Nanking Government, which last spring threatened to be torn to pieces by its internal enemies. Although Feng Yuhsiang has conveniently found himself to be in poor health and has temporarily retired, the Kwangsi party in the south has been a constant irritant to Nanking and it was essential to find some means of uniting the country.
>
> The most convenient method in the past has been agitation against the Japanese, but resentment against Nippon has been played up so constantly that it has become an outworn instrument. A drive against all foreigners to abolish extraterritoriality

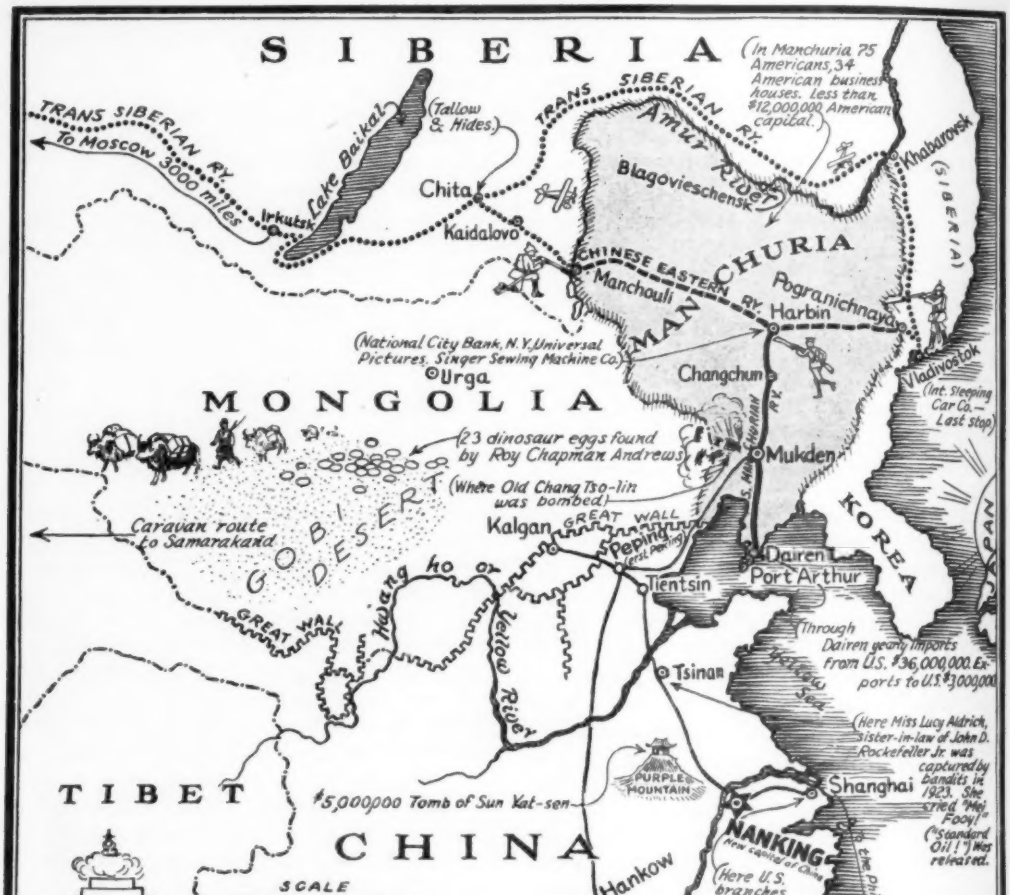
would have been universally popular, but at present China needs more than anything else a loan from foreign bankers, prospects for which would be killed by foreign agitation.

Therefore, Russia, enemy of the capitalistic system and shunned by the bankers, was considered the logical country to serve both Chinese ambitions and the necessity of consolidating the country behind Nanking. If China had waited three years more she could have bought the railroad, since the Sino-Russian treaty of 1924 opens the way to purchase in 1932. Or if China had waited ninety-nine years she could have obtained the railroad without payment.

China, however, knew she was playing a safe game; also the Nanking Government reasoned that Russia could not afford to create unfavorable opinion by violating the Kellogg treaty. They contend that even if Russia did disregard the peace pact she would have a most difficult time waging an offensive at the end of a single-track railroad some 5,000 miles long. Finally, they recognized that Japan, which once went to war to block Russian ambitions in Manchuria, would not allow the Soviet to capture the Chinese Eastern Railroad and become supreme in that rich northland.

China, therefore, knew that, hiding behind Japan, she was taking practically no risk. Or, as one official with long experience in China described the situation today:

"China is barking from behind the legs of Japan and every once in a while giving them a nip."



It is considered especially significant that, according to reports, President Chiang Kai-shek and Chang Hsuehliang, Governor of Manchuria, met in secret conference in Peiping during the first week in July. On July 10 Chang's troops seized the telegraphs and telephones of the Chinese Eastern Railway.

It is knowledge of these preliminary moves

which makes the present negotiation delicate and will probably make it difficult to persuade China to return the railroad before beginning arbitration.

AMERICAN TRADE IN MANCHURIA.—According to press reports of July 21, American interests in Manchuria are summarized thus:

American property in North Manchuria is not extensive, probably less than $12,000,000 being invested in the whole of Manchuria. Most of this is the property of commercial houses established in Harbin, of which the largest are the National City Bank, Standard Oil Company of New York, Dodge & Seymour, manufacturers' agents; Anderson, Meyer & Co., of New York; Baldwin Locomotive Works, Singer Sewing Machine Company, Pacific Oriental Company, Frazar Federal, Inc., American Manchurian Company, Mongolian Produce Company, Manchurian Fur Trading Company and Universal Pictures Corporation. The total number of American firms having offices in Harbin is thirty-four.

The chief exports from North Manchuria are soya beans, furs, hides and carpet wool. An average of $9,500,000 worth of these products clears for the United States annually, but usually through the Japanese leased port of Dairen. The United States sells to Manchuria approximately four times as much, having averaged a total of $36,500,000 during the last four years. This was chiefly automobiles, kerosene, cigarettes, tobacco, railway equipment and agricultural machinery.

The Baldwin Locomotive Works has the largest interest in the Chinese Eastern Railway, having sold it a considerable amount of equipment. The railway's repair shops are at Harbin.

The only large property owned by Americans in North Manchuria is the soya bean plantation of the late Morgan Palmer, who was killed by bandits in 1925. There is no record of who owns the property at present.

The total American population of all Manchuria does not exceed seventy-five. An American consulate is located at Harbin.

LIBERAL CABINET IN JAPAN.—Following the resignation of the Tanaka Cabinet in Japan on July 10, Yuko Hamaguchi, leader of the Minseito or Liberal party, became premier and announced a new ministry with Baron Shidehara as Minister of Foreign Affairs. Mr. Hamaguchi is the third premier without title of nobility. The fall of the military-dominated Tanaka Cabinet was due primarily to dissatisfaction with the results of its sharp Chinese policy, combined with criticism of the investigation which followed the murder of Chang Tso-lin in Manchuria. The report of this investigation censured the Japanese officer in charge for turning over the railway to Chinese guards on the night of the murder, but responsibility was traced no higher.

In a statement of its program, the new government announced a return to the former policy of coöperation with the Chinese Nationalists and revision of the "unequal treaties." Premier Hamaguchi is known to favor high tariffs and a strict policy of retrenchment.

BRITISH TO AID CHINESE NAVY.—Press reports from Shanghai on July 1, included the following official communiqué from the Nanking government.

"An agreement has been signed by the Chinese and British Governments providing for the training of Chinese naval cadets in England and for the engagement by the Chinese Government of a British naval mission to assist in the development of the Chinese Navy.

"It is understood that the Chinese Government has a comprehensive program for the building of a substantial navy, and that it is its intention to construct certain vessels in Great Britain."

While this step is not regarded as indicating that China is to become a naval power overnight, it is taken as indicative not only of Nanking's determination to proceed with the rehabilitation of the obsolete naval defense force but of Britain's attitude toward the growing influence of the new republic.

INTERNATIONAL AGREEMENTS

ANTI-WAR TREATY RATIFIED.—The Kellogg-Briand Pact "renouncing war as an instrument of national policy" was ratified on July 24 in an impressive ceremony at the White House, Washington, where representatives of the fifteen original signatory powers and thirty-one other nations who have also ratified the treaty were present to hear President Hoover's proclamation that

the treaty was in force. Former President Coolidge and ex-Secretary of State Kellogg were also among those attending. Japan's instrument of ratification, which was the last from the fifteen original signatory powers, contained a clause declaring that the phrase "in the names of their respective peoples" was inapplicable so far as Japan was concerned, in view of the provisions of the Japanese Constitution.

CRUISER CONSTRUCTION SUSPENDED.—As a practical move to signalize the ratification of the peace pact, President Hoover on the same date issued a statement suspending construction on the three cruisers authorized in this year's construction program. The President's statement was in essentials as follows:

> We have three cruisers in this year's construction program which have been undertaken in the government navy yards, the detailed drawings for which are now in course of preparation. The actual keels would, in the ordinary course, be laid down some time this fall. Generally speaking, the British cruiser strength considerably exceeds American strength at the present time and the actual construction of these three cruisers would not be likely in themselves to produce inequality in the final result.
>
> We do not wish, however, to have any misunderstanding of our actions, and therefore, we shall not lay these keels until there has been an opportunity for full consideration of their effect upon the final agreement for parity which we expect to reach, although our hopes of relief from construction lie more largely in the latter years of the program under the law of 1928.

As a similar *beau geste*, doubtless prearranged with the United States, Premier MacDonald at the same time announced suspension of work on two cruisers, one submarine station ship, and two submarines. The Premier also announced October as the probable date for his proposed visit to America for direct conversation with President Hoover on naval problems.

PROTEST AGAINST SUSPENSION.—Suspension of cruiser construction by President Hoover called forth considerable criticism, especially from the American Legion and from organized labor, on the ground that this action was not warranted by the terms of the bill authorizing the cruisers, and that it appeared an abandonment of the principle of naval parity with Great Britain. In a reply to Colonel McNutt, head of the American Legion, the President declared that the principle of parity was mutually accepted in the current naval negotiations with England, and he expressed confidence that the Legion would be in sympathy with "parity by negotiation and reduction, rather than by competitive building."

FURTHER LONDON DISCUSSIONS.—At the close of July conversations on the naval question were renewed in London between Ambassadors Dawes and Gibson, representing the United States, and Premier MacDonald and the First Lord of the Admiralty. It was indicated that differences were so far adjusted that a preliminary conference might be held as early as November, and the formal conference in January following.

HISTORY OF NAVAL NEGOTIATIONS.—The fortnightly publication of the Foreign Policy Association Information Service for July 24 (25 cents, 18 East Forty-first Street, New York) is a study entitled "Anglo-American Naval Understanding," with numerous references useful to anyone especially interested in this field. The article is primarily an account of negotiations since the Washington Treaty of 1922. It presents no direct opinions or arguments. The figures given are from *Navies of the World*, printed for use of the House Committee on Naval Affairs, Washington, D. C., 1929, "brought up-to-date by reference to Parliament Debates, official announcements, etc."

NEW PRISONERS AND WOUNDED CODE.—The conference of forty-seven nations at Geneva for preparation of new conventions on prisoners of war and the treatment of sick and wounded in wartime, finished its work on July 27. The new prisoners convention follows the basic plan proposed by the American delegates, and makes stricter provision for the rights of prisoners, including the privilege of communication "without witnesses" with neutral diplomatic representatives, and rapid evacuation from the front. The wounded code treats fully the matter of sanitary transportation by air.

Both conventions were signed by the United States, Mexico, and most of the nations represented. The Soviet Republic did not take part. The agreements are open for ratification until February, 1930.

FRANCE

BRIAND BECOMES PREMIER.—Upon the resignation of Premier Poincaré on July 26, owing to ill health and the necessity of an operation, Foreign Minister Briand was called upon to head the government. Offers were made to the Radicals in the Chamber to include three of their leaders in the Ministry, but upon their refusal Premier Briand decided to continue the Poincaré cabinet without change. M. Briand admitted frankly that his government would probably be short-lived, though he hoped for increased support from the Left groups in matters of foreign policy, which would enable him to carry on through the conference on the Young Plan set to meet at The Hague on August 6, and through the League Assembly in September.

DEBT ACCORD APPROVED.—After thirty-seven hours of powerful argument on the part of Premier Poincaré, the French chamber at last, on July 21, passed a resolution authorizing the President of France to ratify the Mellon-Berenger Debt Agreement. The resolution was carried by the close vote of 300 to 292. No qualifying clauses were attached to this resolution itself, but a separate resolution was adopted declaring that the payments made to England and America should not exceed the payments to France by Germany. The Chamber also approved the Cailloux-Churchill Debt Agreement with England, and both measures subsequently passed in the Senate.

The Mellon-Berenger plan calls for the payment of about four billion dollars, present value, over a period of sixty-two years. Congratulating the French Government on the action of the Chamber and Senate, President Hoover in a note of July 27 emphasized the sacrifices made by each nation in reaching a settlement, and took occasion to point out that by the present arrangement the original debt of France to the United States is reduced 61 per cent.

GREAT BRITAIN

ANGLO-RUSSIAN CONFERENCES.—Following proposals from London and favorable reply from Moscow, M. Dovgalevsky, Soviet Ambassador to France, at the close of July began a series of conversations in London with Foreign Minister Arthur Henderson, preparatory to renewal of diplomatic relations. The conversations ended, however, in a deadlock owing to the refusal of the Soviets to give guarantees regarding propaganda and debt settlement. Prior to the adjournment of Parliament, Premier MacDonald gave assurances that recognition would not be put into effect until the next session of the Parliament, which would be given an opportunity to approve the terms. Relations between the Soviet Republic and England were renewed after the war, but were broken off owing to Communist propaganda revealed by a raid on the Soviet trade headquarters in May, 1927.

GERMANY

BELGIAN MARKS ISSUE SETTLED.—In accordance with her promise at the close of the Experts' Reparation Conference in Paris, Germany in July reached an agreement with Belgium regarding the troublesome Belgian marks issue, arising from the seizure of Belgian gold and currency during the war and the substitution of German paper money. Belgium's claim of over $1,500,000,000 was reduced to $723,000,000, which Germany will pay in thirty-seven annuities.

SPAIN

NEW CONSTITUTION.—The new constitution for Spain drawn up by the De Rivera government was presented to the National Assembly on July 5 for study during the summer. According to press accounts, the new document, which will come up for adoption in October, has the following provisions:

By this Constitution Spain is made a constitutional monarchy with Roman Catholicism as the state religion. The rights of free speech and publication of all Spanish subjects are guaranteed with certain exceptions.

The executive power of the state is vested in the King, who, however, must consult the responsible ministers on important affairs. The legislative power will lie in a single body called the Cortes.

One-half of the Cortes will be elected by universal suffrage, thirty members appointed by royal decree and the rest elected by special classifications or professions as laws later enacted may establish.

There will be one member of the Cortes to each 100,000 inhabitants and there will be no distinction between the sexes. Women as well as men may become members.

The King, profiting by the advice of his Ministers, will initiate all laws except those referring to government expenditures and income which have previously received the approval of one-fifth of the Deputies.

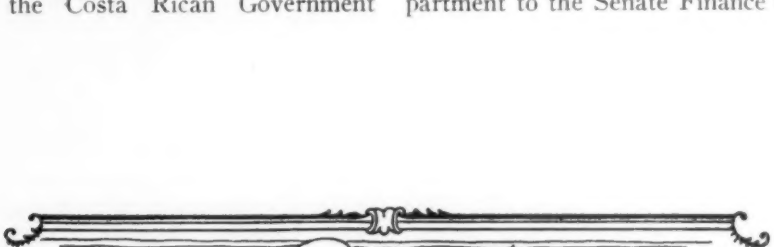
UNITED STATES AND LATIN AMERICA

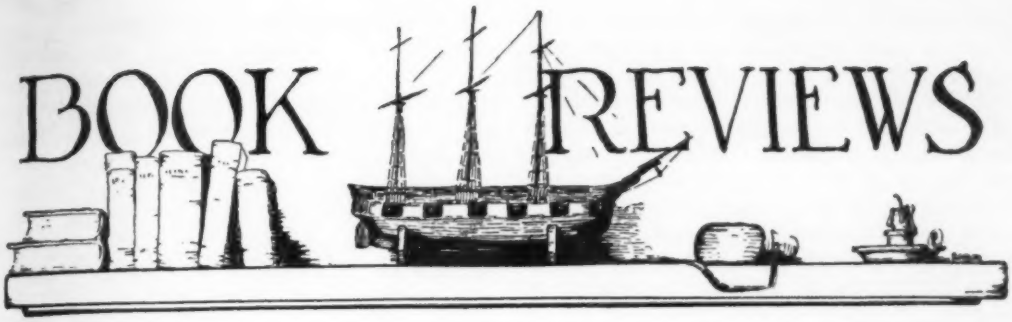
RATIFICATION OF TACNA-ARICA PACT.—The Tacna-Arica accord between Chile and Peru was ratified July 28 at Santiago, Chile. A clause of the treaty, not generally known when it was negotiated, prohibits the cession of any part of the two provinces to a third nation, thus checking Bolivia's hopes for a western sea-outlet under her own political control.

NICARAGUA CANAL SURVEY.—(From August *Current History*)—"The dispatch to Nicaragua of a battalion of engineer troops to make the investigation and survey for the purpose of ascertaining the practicability and the approximate cost of a canal route through Nicaragua as provided for by a recent resolution of the Seventieth Congress was authorized by President Hoover in mid-June. The Nicaraguan Government enthusiastically consented to these troops carrying on such operations as may be necessary. Similarly, the Costa Rican Government granted the request of the United States to permit the troops to enter Costa Rica for the purpose of compiling the requisite information and data with reference to the proposed canal route."

INSTITUTE OF POLITICS PROGRAM.—The Institute of Politics convened at Williamstown, Mass., on August 1 for its ninth annual conference. This year economic questions figured largely in the subjects for round-table discussion, including relations of the United States with Canada, Mexico, and Latin America; world economic stability; post-war constitutional changes in Europe; interallied debts; British industry; and limitation of armament. The leader of the last named round-table conference will be Rear Admiral C. L. Hussey, U. S. N., retired.

PROTESTS ON HIGH TARIFF.—Evidence that economic difficulties may be as fruitful a source of international trouble as political aggression or armaments is found in the fact that, according to Washington dispatches of July 9, thirty-eight nations had at that time filed protests against the increased rates of the new tariff bill now before the United States Congress. These protests have on request been forwarded by the State Department to the Senate Finance Committee.





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LIFE OF A SEA OFFICER, Jeffrey Baron de Raigersfeld, Rear Admiral of the Red. Edited by L. G. Carr Laughton. London: Cassell. 1929. 10s. 6d.

REVIEWED BY L. H. BOLANDER, *U. S. Naval Academy Library*

The life of an English admiral who was a contemporary of Nelson is sure to be interesting; when such an officer is a close observer, a keen student of his profession, and a very fine gentleman as well, his autobiography takes on added charm and dignity. Admiral Raigersfeld was born in 1771 of Austrian parents. When only seven years old he was entered on the books of H.M.S. *Lion* by Captain Cornwallis, afterwards Admiral the Honorable Sir William Cornwallis, though it is unlikely that he ever saw the ship until years after. When a boy of twelve he first went to sea under Captain Cuthbert Collingwood in the *Mediator,* and under the careful guidance of that officer learned the rudiments of the naval profession.

In 1794, while a lieutenant on board the *Speedy,* he was captured by the French and came near being put to death by the infamous "No-Quarter Decree" of the French Republican convention. Though he and his men escaped execution by a narrow margin, they were treated very severely for a time. He escaped eventually and succeeded in reaching the British fleet on the Mediterranean station under Admiral Hotham. His subsequent career in the Navy carried him to the rank of rear admiral of the red, though it never afforded him opportunity for distinguished service.

His manner of narrating his adventures is rather odd, for he seldom supplies you with a date. Writing for his family rather than for the general public, he wrote of events only as they affected him, so that his book is strictly an autobiography, and not a commentary on the men and events of his time. Nevertheless his appraisal of his first commander, Collingwood, is pleasing and valuable, and his comment on other officers with whom he came in contact merits consideration. His picture of life in the British Navy of that time is fascinating. The food of course was far from good and naturally drew from him considerable comment. His hunger for fresh meat was so great that he actually ate rats, and pronounced them as good as rabbit. He seems to have been a connoisseur, too, on the maggots and weevils that infested the ship's biscuit.

He has a provoking habit of leaving out interesting details from what must have been stirring adventure. For instance, during the mutiny at the Nore he was serving on the *Prince Frederick.* He was much worried lest his men join the mutineers, yet he says, "by various ways and means" he prevented them from doing so, and leaves the details to your imagination. In matters connected with naval history he is apt to be inaccurate. He describes how when at school at Whitehaven, "a great noise was made about Paul Jones, who, it was said, was on the coast with the intention of burning the shipping in the harbor, as well as to sack the town."

He describes the preparations made to defend the place, in which he took some part; he was then about seven years old. He felt "as though their ardour alone had driven that determined character out of the neighborhood, although no one could positively say that he had ever been seen thereabouts." Yet it is an historical fact that on April 23, 1778, Jones did actually descend on Whitehaven and attempt to burn the shipping.

While at sea he pursued his hobby of painting at every opportunity, with the result that in later life he exhibited paintings at the Royal Academy. One of his admirable sea scenes the publisher has used as a frontispiece for his book.

He must have written about 1830, for the first edition was published not later than 1831. This edition must have been very small, for only one copy is known to exist and that is in the Admiralty Library. The present edition (the second) is ably edited by the English naval historian L. G. Carr Laughton.

A SAGA OF THE SEA. By F. Britten Austin. New York: The Macmillan Company. 1929. $2.50

REVIEWED BY ROBERT H. JAMES, *Department of English, U.S.N.A.*

Here is a book that will appeal to the lover of vigorous, blood-stirring fiction, to him who enjoys vivid, picturesque stories of the sea, to the historian, and to the scholar. For Mr. Austin has proved himself both artist and scholar. He has chosen for the setting of his stories a background which seldom fails to fascinate. With painstaking care he has scanned the pages of history and selected therefrom episodes both dramatically interesting and historically significant. Then he has added character, romance, and suspense to these situations as only one of imaginative genius and artistic skill could do. The result is a pleasing one.

A Saga of the Sea is not a novel. It is a group of stories, related only insofar as each marks a step in the history of the sea from the time of Homer up to the present era. But this relationship is sufficient for us to feel a sense of unity, and we read from story to story not a great deal unlike the way we read a novel. The first story, naturally enough, has for its hero Odysseus of the Homeric legends, who with his stout-hearted men ploughs the sea in search of new lands, wealth, and fair women, ever devising stratagems for the destruction of his enemy, the Phoenicians. It is these same Phoenicians, at the height of their power in the eighth century, B.C., who furnish the background for the second story. These were a mercenary and nomadic people, and "Beyond Pillars of Melkart, B.C. 740," is a vividly colored story of what might have happened among these people when first one wealthy merchant then another had power.

There is a lapse of several hundred years between this story and the time of the next one, which is called "Cleopatra at Actium," wherein we have the ever fascinating story of Anthony and the Egyptian queen treated in an original manner. In the next story we leave the Mediterranean for the northern seas, and the vikings become our heroes. But in the story of "Venice, the Serene Republic" we have again returned to the Mediterranean. In succession thereafter the saga presents stories of Columbus, of the era of the Dutch supremacy, of Nelson at Trafalgar, of the bold clipper ships of the 1840's, and, finally, of the fight between the *Monitor* and the *Merrimac*, the event which marked the beginning of the era of the modern steel ship. This completes the saga.

This is not to say, however, that the chief interest of these stories is an historical one. Mr. Austin has indeed treated his subject with such artistry that his tales are entirely original. We feel this way even of those stories which are most thoroughly founded on historical fact. The story of Actium, for example, where Anthony gave up his chances for an empire to fly with the charming queen of the Egyptians is by no means new to us. But Mr. Austin's portraits of these characters make them seem more real than does any picture history has given us. The same thing is true of Mr. Austin's Odysseus. Homer's hero is here in a new situation, but he is the same classic character, reappearing before us with renewed vitality. And all of the characters in *A Saga of the Sea* impress us similarly. They throw aside the cold shrouds which history has given them and return to us as vigorously reanimated men of reality, men who lived and loved as other men, men to whom life

was a struggle and a challange, and men who were willing to suffer to accomplish the ideals they set out to attain.

Writing a book of this kind presented its problems to its author. First of all, he must needs be a scholar. This Mr. Austin proves himself to be. He has brought a rich store of learning into use in *A Saga of the Sea.* He shows a knowledge of history which one rarely finds nowadays in the writer of fiction. We are usually sufficiently pleased to find that an author knows a single period of history, and we pray that he confines his writings to that period. But Mr. Austin has more than fulfilled our wishes. He demonstrates clearly that he is familiar with all the periods of which he treats. His stories show a remarkable knowledge of the manners, customs, and religions of the people about whom he writes. He speaks with accuracy of ships, and of sea customs of all times, and his historical references are authentic. He must have been thoroughly familiar with the legends of Homer, the sagas of the Scandinavians, and with the Anglo-Saxon poems; we marvel at the success with which he has given the Homeric flavors to the story of Odysseus, and the spirit of old English tales to his story of the Vikings.

It is difficult, therefore, to say just where is the chief interest for us in *A Saga of the Sea.* But we do know that we are carried along from story to story by the sheer delight in reading them. The vivid, colorful descriptions of old cities, ships, fleets, and battles, the wonderful portraits of sturdy followers of the sea, the subtle handling of the stories, with sudden and dramatic turns in the situations, make *A Saga of the Sea* well worth comparison with the best sea stories in literature.

A SAGA OF THE SWORD. By F. Britten Austin. New York: The Macmillan Company. 1929. $2.50.

Reviewed by Ensign Sidney L. Smith, *U. S. Navy*

To those who have read *The Saturday Evening Post* during the past year or two the above title will be familiar, as it covered a series of short stories which appeared at intervals in that magazine. Recently these stories have been gathered together and published in book form, making a very readable volume.

In *A Saga of the Sword* Mr. Austin traces the development of weapons and tactics from the prehistoric days of tribe fighting on down the centuries to a climax in the last great war of nations against nations. Commencing with the primitive spear and stone-headed club, we are led in a series of steps through the development of new weapons and new tactics, each in turn to be overcome and rendered obsolete by more formidable weapons and more effective tactics. While this may sound like very dry reading to some, the contrary is the case, as the technical points are handled skillfully and are not thrust forward at the expense of the story interest.

The first story, "War Comes to the World," pictures old Grey-Fox the magic-maker, Black-Eagle the chief, and Grass-Snake his wife sitting together in a hut, confronted with the necessity of finding a sufficient supply of food for the tribe—either that or being themselves sacrificed to the great Mother-Goddess, the food provider—and from this council develops the then novel idea of attacking a neighboring tribe to provide both the necessary human sacrifices and the needed hunting grounds. From this crude beginning war develops in succeeding stories—wars of city against city in the Mesopotamian plain; Alexander's Macedonians fighting the Persians; Rome versus Carthage; the passing of the Roman legions under the terrible attacks of the Gothic mailed cavalry; the great conflict of the Cross and the Crescent in Europe, culminating at Tours in the decisive defeat of the Mohammedans by Karl the Hammerer; the Crusaders capturing Jerusalem, and organized infantry once more triumphing on the battlefield; then enters the man with the gun and makes an end to the armored knights and their chivalry; Gustavus Adolphus defeats Marshal Tilly and we see plainly the necessity for iron discipline on the smoke-whelmed battlefields of that day; the Grande Armée of Napoleon, foiled in its invasion of England, marches swiftly to the eastward and defeats in detail the Austrians and Russians; then the Franco-Prussian War, which sounds the death knell of the cavalry charge, as the picked horsemen of France wilt and break under the murderous fire of breech-loading rifles; and last of all

appears the tank on the battlefields of France to dispute supremacy with the machine gun, and to signalize the advent of machinery as a substitute for infantry as the backbone of the attack.

THE ENGLISH NAVY IN THE REVOLUTION OF 1688. By Edward B. Powley. Cambridge: University Press. 1928. $5.00.

REVIEWED BY LIEUTENANT COMMANDER H. H. FROST, *U. S. Navy*

Just a century after the memorable defeat of the Spanish Armada, Prince William of Orange commenced an enterprise which had many points of similarity. At first glance this statement will appear surprising, for certainly no two campaigns could have resulted more differently.

It has been customary to call the affair of 1688 a revolution, for so it culminated. But certainly it was initiated as an invasion and might well have developed into another bitterly fought Anglo-Dutch war. Had Alexander of Parma been able to dodge the English fleets in 1588 as fortunately and to effect a landing as simply as did William of Orange in 1688 it is conceivable that he might have had equal success in establishing a new dynasty on the English throne. While the Virgin Queen had a more secure political tenure than the last of the Stuarts, still there was widespread disaffection throughout her realm and there were many influential persons who would not have been adverse to a change in dynasty. She had no army capable of resisting the veteran tercios under the Spanish standard nor a general who could be mentioned in the same breath with Alexander. But Elizabeth did have a fleet, animated by an intense hatred of the invader and commanded by wide-awake admirals. Also she was blessed with abundant good luck—and James II was not. It was on November 1, 1688, in blustery autumn weather that William's armada sailed from Helvoetsluys. He had some forty ships of the line, ten fireships and three hundred transports. The latter carried about 9,000 infantry and 3,000 cavalry—with their horses. The enterprise was hazardous in the extreme. Mr. Powley calls it "a colossal gamble." And the reader will agree.

Directly opposed to the invader was a formidable, if somewhat hastily assembled, fleet of thirty-two sail of the line and thirteen fireships. It rode at anchor off Gunfleet Buoy, just to the northward of the irregularly spaced shoals which fill what we might call the Thames Delta. From the *Resolution* flew the flag of the best English admiral of the day—Lord Dartmouth. This fleet had been mobilized under the personal direction of King James for the express purpose of intercepting and defeating the Dutch Armada. Incidentally, the illuminating details of such a mobilization, as set forth by Mr. Powley, are by no means the least interesting part of his book.

On October 1 Samuel Pepys, by His Majesty's command, had sent the admiral his warrant. This is a most interesting document and, curiously enough, it conforms closely in form and spirit to the orders an admiral would receive from our President should a similar situation develop today.

The warrant begins as follows: "Whereas we have received undoubted Advice, That a great and sudden Invasion from Holland, with an Armed Force of Foreigners and Strangers, will be made speedily in an Hostile manner upon this Our Kingdom." So much for the information of the enemy.

Then follows a list of the ships composing the fleet and the designation of the flagship. "Which Fleet," the warrant continued, "and every part thereof We (out of Our entire reliance upon your approved Loyalty, Valour, Circumspection, and Experience) do hereby Authorize and Empower you to lead, and by your Orders to direct and dispose of at all Times, and in all Emergencies, as you in your Discretion shall judge most conducing to Our Honour, and the Security of Our Dominions, and particularly in preventing the approach of any Fleet or Number of Ships of War from Holland upon any of our Coasts, or their making any Descent upon the same. Towards your more effectual Execution whereof, We do hereby further Empower and Require you, to endeavor by all Hostile Means to sink, burn, take, and otherwise destroy and disable the said Fleet and Ships thereof, when and wheresoever you shall meet with, or otherwise think fit to look out for and attack the same."

If so grave a danger lay in front, one equally grave was impending in rear, for

Louis XIV had been threatening war against Holland and its outbreak had long been imminent.

William had long been estimating the most unusual situation which confronted him. While not generally credited with military brilliance, he did some shrewd thinking on this occasion. To invade England the usual plan would be to first secure the command of the sea by defeating the English fleet. But this idea was not to be thought of. In the first place there was a good chance that his own fleet would be the one beaten. In the second, to beat the English fleet would only bring on another Anglo-Dutch war, and William wanted England friendly instead of hostile with Louis about to jump upon his back.

Nor would any plan of fraternizing with the English fleet have been lucky. True, there were some English captains who sympathized with his plans and were ready to help in an underhand way. But they were far from ready to come out into the open and expose their heads to the axe-stroke by treasonable conduct in battle. Dartmouth and his rear admiral were strictly loyal to James and desirous of fighting. "I hear," Dartmouth wrote the King, "they wear English colours and talke of treateing with us, but pray, Sir, be assured I will suffer no language to be spoke to them but out of your guns." Once broadsides were flying all the latent bitterness which the recent wars had provoked would again have burst out and a fight to the finish would have been the result.

On the other hand, could William land with an army on English soil without fighting, then he could pose as a liberator from oppression and a defender of the Protestant faith. In this guise he could count upon much assistance from the English themselves and possibly force James into flight without fighting a battle. Thus a combined expedition was indicated—with the fleet playing a defensive rôle only. It would hold off, with as little fighting as possible, the English fleet —should it unfortunately be encountered before the army was landed. Policy had to be mixed liberally with strategy to win success.

While William was mulling over these ideas two incidents convinced him that the time was now or never. First, he received an "invitation" to come to England from seven influential nobles. Second, Louis blundered by sending a large part of his army toward the Rhine. Now was the time for that trick forward pass over left end he had been rehearsing so long. The English Channel was a mighty wide Rubicon, but he decided to cross it.

An easterly gale just suited his purpose. It blew his armada along the south coast of England and shut poor unlucky Dartmouth up among the shoals of the Thames. On November 5 the Dutch arrived at Torbay and commenced landing their troops. Gales and casualties hit Dartmouth hard and when he finally beat his way around the shoals only twenty-eight of the line remained with the flag. Thus reduced, he felt unable to attack the Dutch in their prepared position and led his dispirited and battered squadron into Spithead.

William, to avoid Dartmouth, had been forced to land in a part of the country where no plans—either hostile or friendly—had been made for his reception. Thus the situation developed slowly. William was none too cheered by the small numbers which joined his standard—and James was assembling an army at Salisbury. It was very much touch and go! At length on the twenty-fourth James left his army and acknowledged defeat. During this period of inactivity intrigue had flourished at Spithead. Discipline gradually was so far undermined that Dartmouth felt that he could no longer count upon his squadron. On December 11 word came in that the King had fled from London. One of the conspirators contrived to deliver a letter from William to the admiral, who surrendered his fleet the next day.

Rarely have skill and judgment been combined with energy and daring to win so decisive a success in so brief a time—and practically without firing a shot. William's very ability has reacted against his reputation, for the ease and simplicity with which the campaign was decided have hidden its difficulties and dangers. True it is that he had abundant luck—but he deserved all of it.

Mr. Powley deserves credit for having illuminated this interesting and much neglected campaign with a new light. Since reading his book, it takes on an entirely new aspect and gives us an excellent opportunity to observe and study the interlocking relations of policy and strategy. He has been enabled to do this only after an exhaustive

research of contemporary documents. We may learn from the correspondence of James, Pepys, and Dartmouth how a fleet was mobilized, administered and operated two and a half centuries ago. Perhaps at times we might wish for a little more definite presentation of the march of events and for a map which covers the entire theater of operations, but these are only minor criticisms of a book which we have much enjoyed.

BROWN'S PRACTICAL POCKET BOOK FOR MERCHANT SEAMEN, Fifth Edition. By J. McKerrell. Glasgow: Brown, Son & Ferguson, Ltd. 1929. 6/6.

This book is the fifth edition and has been much enlarged. Its purpose as stated by the author is to provide in handy form odd bits of information which cannot always be found when wanted.

It contains various mathematical formulae and approximate weights per cubic foot of usual merchant cargoes and in addition many other valuable tables and formulae for safe working notes, notes on loading, weather, and navigational data. The next part is devoted to ropes, tackle, blocks, chains, etc., giving composition, formulae for safe strain together with proper rigs and formulae for determining safe loads for each rig. There are also sections devoted to metals and their weights, notes on stability and trim, use of oil at sea, specific gravities, weights, and measures, useful tables and thumb rules for navigation purposes, paints and varnishes, and odd tips.

A wide variety of subjects is covered in a very small book. The information given is useful, concisely put, and the book should be of great value for the purpose intended.

W.S.F.

LE DRAME DU JUTLAND. By Edmund Delage. Paris: Bernard Grasset. 1929. 12 Frs.

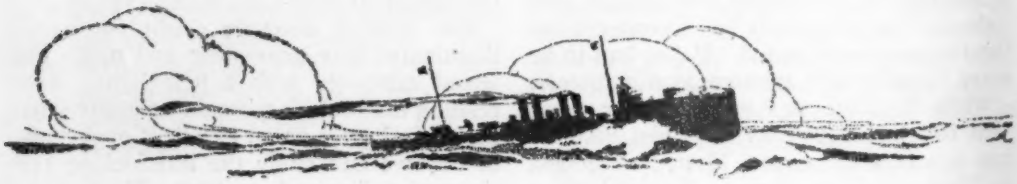
REVIEWED BY LIEUTENANT COMMANDER H. H. FROST, *U. S. Navy*

M. Delage has written a very readable and concise summary of the main features of the Battle of Jutland. While he has written along conventional lines and has not presented new information or startling ideas, still he has given a correct and realistic picture of the greatest sea fight of modern times. He maintains a high degree of accuracy—only a few very unimportant errors have been detected. He has treated the subject in a most fair and impartial manner. The comments are generally very sound and well taken—though not particularly original. In fact, in this respect the author gives one the impression of a small town baseball umpire who gives the close decisions first to one team and then to the other to maintain a balance of fairness. M. Delage sticks closely to the middle of the road, with a slight leaning towards his British allies.

The maps are sufficient to indicate the general course of the action. A number of pages are given to a description of the fleets. It is suggested that the same purpose could have been accomplished through a table with more clarity and conciseness.

Incidentally, a profound knowledge of French is not necessary for reading this little volume and an unfamiliar word here and there need not deter one from the attempt. Usually the context will indicate its meaning, at least approximately. It affords an excellent opportunity to learn the nautical terms and idioms which are seldom found in textbooks.

The book is already in its fourth edition in France, which indicates the popularity it has won there.



Courtesy U. S. Naval Academy

Presented to the Naval Academy by William Decatur Parsons

SWORD OF COMMODORE STEPHEN DECATUR PRESENTED TO HIM BY THE CITY OF PHILADELPHIA, FEBRUARY 14, 1813

On the hilt are the words of Decatur's father, on learning that his other son, James, had been killed at Tripoli: "Our children are our country's property."

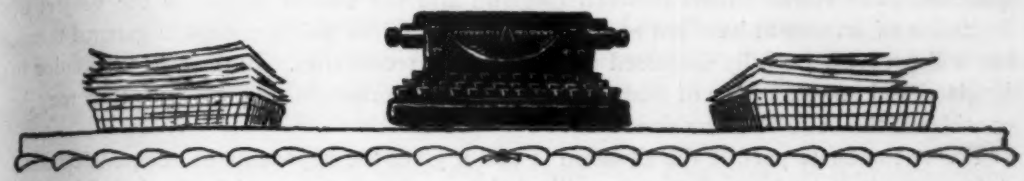
Courtesy U. S. Naval Academy

CAPTAIN STEPHEN DECATUR

This fine miniature, the work of an Italian artist, was the one noticed in the cabin of the U.S.S. *Congress* at Norfolk, by a young lady named Susan Wheeler, daughter of the mayor, on the return of Decatur to the United States from Tripoli in the fall of 1805. Miss Wheeler and her friends wanted to meet the young hero—an incident that led to the marriage of Captain Decatur and Miss Wheeler.

The miniature was recently presented to the Naval Academy by William Decatur Parsons.

SECRETARY'S NOTES



National policy and the Navy

Military students have always held that the armed forces of a country are the instruments of policy. That is axiomatic. If we are to submit to any demand, whether just or unjust, made by a foreign power, then we have no need for armed forces except for internal policing. They are a wasted investment. If we wish to speak with the voice of authority due our position in world affairs, then we must have armed forces commensurate with our position. By recent treaties, signed by over forty states, war is no longer an instrument of policy. But disarm, and see how much attention is paid to your voice in the concert of nations.

Policies are transient at times; some acquire the dignity of age, some become vital to the welfare of a nation. Also, policies are subject to different interpretations, to fit the times or situations. The armed forces of the country are solely for the support of our policies, and their interpretations, by our people, not by foreign governments.

The military forces of the country are not the policy-making branch of the government; the members of the military forces, as individuals, have the same rights as other citizens in formulating policies; as an organization, their duty is solely to support the government in the expressed policy of the people as a whole.

In 1922, when the people of this country accepted the 5-5-3 policy of naval strength, as pronounced at the Washington Conference, the Navy recognized this as the national policy, although many naval officers were individually suspicious of it. The people of the country thought that the navies of Great Britain, the United States, and Japan were to have a relative strength of 5-5-3. The few years that have intervened since the signing of the agreement have served to disillusion them and have verified the suspicions of the doubters.

And when the responsible naval officers, those responsible to the President and the people of the United States, focused attention on the fact that the other signatories were violating the spirit of the pact, and were indulging in a building spree that left the United States far in the rear, the people of the country promptly insisted that the spirit of the conference be lived up to. For doing their duty, these naval officers are called "naval experts" and "big-navy men"! They are biased! The country can thank God that they are biased enough to do their duty. As for being for a big navy, they want the navy the people of the country think we are entitled to have, a navy equal to Great Britain's.

The President supports the policy of parity and the Navy supports the policy of parity, for that is the will of the people. The question of the size of the resultant navies is one for the principal maritime nations to decide. Naval officers of these nations will be consulted, as they are technically qualified to advise on this all-important subject.

Sneering reference to "naval experts" and "big-navy men" will not divert them from their duty to the nation.

The cruiser holiday

The holding up of three of the first five cruisers of the program voted by Congress in the early part of the year has been the occasion of considerable comment. No doubt the President considered that the situation warranted it and the Navy will await with interest the developments in this momentous question. The conversations between England and the United States on the subject of limitation of armament have not as yet been released to the public except in general terms, but will probably be fully discussed when Congress reconvenes. Both our ambassador to England and our Secretary of State have stressed the principle of parity, so that may be considered the basis of discussion.

The unfortunate part of the situation is that it gives the opponents of adequate national defense an opportunity to defeat the will of the people as expressed in the last legislative action of Congress. Yard sticks are already being adjusted to measure our ancient and honorable cruisers of the 1890-1905 vintage. Pseudo naval experts will compare their value and assign them to the United States Navy for another quarter century. We wonder if these same people use automobiles of the 1905 vintage in the conduct of their business; or if they use 1905 engineering processes for 1930 construction.

We remember eleven years ago convoying troops to Europe with cruiser protection of the 1905 model. If Germany had slipped one of her powerful cruisers into the North Atlantic, as she did her raiders, our protection would have been nil; thousands of soldiers would have been sunk without a trace. A good many of our soldiers must have been pondering on the same possibility and for that reason are strong for an adequate navy.

That was eleven years ago!

The "Olympia" passes

Certainly this gallant old ship has earned her rest. Nearly forty years of service, in which was included two wars, and dear to the hearts of the people. An outcry to preserve her has arisen over the whole country. It is hoped that the small amount that might be saved the government by scrapping this famous ship will not prevent her being kept for posterity.

"We Build a Navy" by Frost

The Naval Institute has about completed negotiations with the Macmillan Company, of New York, to take over the sale of this book to the general public. The book has found favor with the public and we feel that a larger field will be served with the Macmillan Company handling the book.

The Institute will continue to serve its members, but other sales will all be taken care of by the Macmillan Company. The book is worth while and we hope this arrangement will result in a much wider distribution.

Time to batten down

In these piping times of peace the United States may well look at the international situation to see how it affects this country. Needless to say, the world looks at us with envious eyes; we are in the driver's seat, and that arouses a storm in itself; that we have earned this right does not bear on the subject.

European nations are at each other's throats on the subject of reparations or so it would appear from the public press. One paper ingeniously suggests that the whole stir is for the purpose of getting the United States to ease down on Great Britain's payments to us; that the cruiser differences might be settled if we should do so. We hardly believe this; Great Britain's statesmen would never dare to sell her national defense. No, the money saved in reparations would not make up for security. If that had been the case, the money saved by the Washington Conference would not have gone into cruisers.

Our tariff bill has met with a storm of foreign protest; probably no easing up will result from these protests, and the grievances will still remain. What the eventual effect will be we will know when the tariff bill is passed.

In the Far East, Russia and China are watching each other and ready to spring. Russia claims violation of economic rights while China claims violation of political rights. This country is concerned as we have always been concerned in affairs affecting China.

All may blow over, but then again it may not. A wise mariner battens down when storm clouds appear. It is easier to open up if the storm fails to appear than to secure things about the decks after the storm has started.

Speaking of storms

The following letter was received from a member. It is of interest because of the parallel drawn between sailing-ship seamanship and submarine seamanship:

DEAR SIR:

I noted with interest the reference in Lieutenant Kirkpatrick's article on submarines in the March issue of the PROCEEDINGS to the ability to locate valves in the dark—the great value of such an attainment in case of sudden emergency.

This brings my mind back to my sailing-ship days, when no sailorman was considered an able seaman unless he could unfailingly and without an instant's hesitation place his hands on any piece of running gear belayed on the pinrail or fiferail in the darkest night midst the confusion of a sudden squall. Not only that, but we were required to know as we knew our abc's the lead of every piece of gear—which one of the three sheaves of a treble block it rove through. In fact we knew our ship almost as well by night as by day.

And later, in steam: I can well recollect that my one-time shipmate, Assistant Engineer George Danforth (as his title was some thirty-five years ago), could duplicate this knowledge in the engine rooms and fire rooms of the old cruiser *New York*. I have even heard it stated that he could tell offhand the dimensions of the bolts in most of the pipe flanges and their number, but I will not vouch for this myself.

However, although this useful attainment can be achieved to a marked degree by study and application, nevertheless I believe that with many it is a "gift" that comes naturally with them.

More illustrations needed

The editor finds the gathering of illustrations one of his most difficult duties. When we consider that we have possibly one of the largest potential sources of supply, it looks as though we are not making the most of our opportunities.

Send us in your snap shots, many of them would be entirely appropriate for the PROCEEDINGS. And they would help out the editor a whole lot.

Some day we may be able to support field photographers, but in the meantime we need your help.

Williamstown spouts

Just why we should have this annual affliction is not known. Meddlers are at best a nuisance, but providing accommodations and publicity for them seems a bit too much.

Perhaps this annual spouting relieves the pressure and serves some purpose, but it certainly is a nuisance. Why not transfer these activities to some other country for a change.

Book wanted

One of the Naval Institute's customers desires to obtain a copy of the seventh edition of Dyson's *Practical Marine Engineering*. If any of our readers have a copy of this book in good condition which they are willing to dispose of for $5.00 or $6.00, please communicate with the Secretary-Treasurer.

Special Notice

Naval Institute Prize Essay, 1930

A PRIZE NOT TO EXCEED FIVE HUNDRED DOLLARS WITH A GOLD MEDAL, and a life membership in the Institute (unless the author is already a life member, in which case he will receive the commuted value thereof), is offered by the Naval Institute for the best essay submitted on any subject pertaining to the naval profession.

The following rules will govern this competition:

1. The award of the prize to be made by the Board of Control, voting by ballot and without knowledge of the names of the competitors.

2. Each competitor to send his essay to the Secretary-Treasurer in a sealed envelope marked "Prize Essay Contest." The name of the writer shall not appear on the essay, but instead thereof a motto. Accompanying the essay a separate sealed envelope will be sent to the Secretary-Treasurer, with the motto on the outside and the writer's name and motto inside. This envelope will not be opened until after the decision of the board. Essays must be received on or before January 1, 1930.

3. In addition to the "Naval Institute Prize," one or more essays may receive "Honorable Mention," if of sufficient merit to justify that award; or, in the event that no essay is adjudged of sufficient merit to receive the "Prize," the best essay submitted may receive "Honorable Mention" in lieu thereof.

4. In case one or more essays receive "Honorable Mention" the writers thereof will each receive a prize, the amount of such awards to be decided by the Board of Control in each case.

5. Announcement of awards will be made as soon as practicable after January 1, 1930.

6. Essays awarded the "Naval Institute Prize" or "Honorable Mention" will be published in the NAVAL INSTITUTE PROCEEDINGS as soon as practicable. Essays not awarded a prize may be published at the discretion of the Board of Control, and the writers of such articles shall be compensated at the established rate for articles not submitted in competition.

7. Articles shall be limited to eleven (11) printed pages in the PROCEEDINGS (approximately 8,000 words), but shorter articles will receive equal consideration.

8. In event of the prize being awarded to the winner of a previous year, a gold clasp suitably engraved will be given in lieu of the medal.

9. All essays must be typewritten, double spaced, and submitted in duplicate.

R. C. MACFALL
Captain, U.S.N., Secretary-Treasurer